

$\psi(2S)$

$I^G(J^{PC}) = 0^-(1^- -)$

See the Review on “ $\psi(2S)$ and χ_c branching ratios” before the $\chi_{c0}(1P)$ Listings.

$\psi(2S)$ MASS

OUR FIT includes measurements of $m_{\psi(2S)}$, $m_{\psi(3770)}$, and $m_{\psi(3770)} - m_{\psi(2S)}$.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
3686.109^{+0.012}_{-0.014} OUR FIT				
3686.108^{+0.011}_{-0.014} OUR AVERAGE				
3686.12 ± 0.06 ± 0.10	4k	AAIJ	12H LHCb $p p \rightarrow J/\psi \pi^+ \pi^- X$	
3686.114 ± 0.007 ^{+0.011} _{-0.016}	1	ANASHIN	12 KEDR $e^+ e^- \rightarrow$ hadrons	
3686.111 ± 0.025 ^{+0.009}		AULCHENKO	03 KEDR $e^+ e^- \rightarrow$ hadrons	
3685.95 ± 0.10	413	ARTAMONOV 00	OLYA $e^+ e^- \rightarrow$ hadrons	
3685.98 ± 0.09 ± 0.04		ARMSTRONG 93B	E760 $\bar{p} p \rightarrow e^+ e^-$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3686.00 ± 0.10	413	ZHOLENTZ 80	OLYA $e^+ e^-$	

¹ From the scans in 2004 and 2006. ANASHIN 12 reports the value $3686.114 \pm 0.007 \pm 0.011$ MeV, where the third uncertainty is due to assumptions on the interference between the resonance and hadronic continuum. We combined the two systematic uncertainties.

² Reanalysis of ZHOLENTZ 80 using new electron mass (COHEN 87) and radiative corrections (KURAEV 85).

³ Mass central value and systematic error recalculated by us according to Eq. (16) in ARMSTRONG 93B, using the value for the $J/\psi(1S)$ mass from AULCHENKO 03.

⁴ Superseded by ARTAMONOV 00.

NODE=M071

NODE=M071M

NODE=M071M

NODE=M071M

NODE=M071M;LINKAGE=AN

NODE=M071M;LINKAGE=AR

NODE=M071M;LINKAGE=NW

NODE=M071M;LINKAGE=RZ

NODE=M071DM

NODE=M071DM

NODE=M071DM;LINKAGE=R
NODE=M071DM;LINKAGE=BD

NODE=M071W

NODE=M071W
NEW

NODE=M071W;LINKAGE=BC

NODE=M071W;LINKAGE=AN

$m_{\psi(2S)} - m_{J/\psi(1S)}$

VALUE (MeV)		DOCUMENT ID	TECN	COMMENT
589.188^{+0.028} OUR AVERAGE				
589.194 $\pm 0.027 \pm 0.011$	1	AULCHENKO 03	KEDR $e^+ e^- \rightarrow$ hadrons	
589.7 ± 1.2		LEMOIGNE 82	GOLI 185 $\pi^- Be \rightarrow \gamma \mu^+ \mu^- A$	
589.07 ± 0.13	1	ZHOLENTZ 80	OLYA $e^+ e^-$	
588.7 ± 0.8		LUTH 75	MRK1	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
588 ± 1	2	BAI	98E BES $e^+ e^-$	

¹ Redundant with data in mass above.

² Systematic errors not evaluated.

$\psi(2S)$ WIDTH

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
303^{± 9} OUR FIT				
[304 ± 9 keV OUR 2012 FIT]				
286^{± 16} OUR AVERAGE				
358 $\pm 88 \pm 4$		ABLIKIM 08B	BES2 $e^+ e^- \rightarrow$ hadrons	
290 $\pm 25 \pm 4$	2.7k	ANDREOTTI 07	E835 $p \bar{p} \rightarrow e^+ e^-$, $J/\psi X$	
331 $\pm 58 \pm 2$		ABLIKIM 06L	BES2 $e^+ e^- \rightarrow$ hadrons	
264 ± 27	1	BAI 02B	BES2 $e^+ e^-$	
287 $\pm 37 \pm 16$	2	ARMSTRONG 93B	E760 $\bar{p} p \rightarrow e^+ e^-$	

¹ From a simultaneous fit to the hadronic and $\mu^+ \mu^-$ cross section, assuming $\Gamma = \Gamma_h + \Gamma_e + \Gamma_\mu + \Gamma_\tau$ and lepton universality. Does not include vacuum polarization correction.

² The initial-state radiation correction reevaluated by ANDREOTTI 07 in its Ref. [4].

$\psi(2S)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
Γ_1 hadrons	(97.85 \pm 0.13) %		DESIG=3
Γ_2 virtual $\gamma \rightarrow$ hadrons	(1.73 \pm 0.14) %	S=1.5	DESIG=4
Γ_3 $g g g$	(10.6 \pm 1.6) %		DESIG=255
Γ_4 $\gamma g g$	(1.03 \pm 0.29) %		DESIG=256
Γ_5 light hadrons	(15.4 \pm 1.5) %		DESIG=226
Γ_6 $e^+ e^-$	(7.82 \pm 0.17) $\times 10^{-3}$		DESIG=1
Γ_7 $\mu^+ \mu^-$	(7.8 \pm 0.9) $\times 10^{-3}$		DESIG=2
Γ_8 $\tau^+ \tau^-$	(3.1 \pm 0.4) $\times 10^{-3}$		DESIG=68
Decays into $J/\psi(1S)$ and anything			
Γ_9 $J/\psi(1S)$ anything	(60.3 \pm 0.7) %		NODE=M071;CLUMP=A
Γ_{10} $J/\psi(1S)$ neutrals	(24.9 \pm 0.4) %		DESIG=11
Γ_{11} $J/\psi(1S) \pi^+ \pi^-$	(34.0 \pm 0.4) %		DESIG=12
Γ_{12} $J/\psi(1S) \pi^0 \pi^0$	(17.93 \pm 0.33) %		DESIG=13
Γ_{13} $J/\psi(1S) \eta$	(3.33 \pm 0.05) %		DESIG=14
Γ_{14} $J/\psi(1S) \pi^0$	(1.268 \pm 0.032) $\times 10^{-3}$		DESIG=15
Hadronic decays			
Γ_{15} $\pi^0 h_c(1P)$	(8.6 \pm 1.3) $\times 10^{-4}$		NODE=M071;CLUMP=B
Γ_{16} $3(\pi^+ \pi^-) \pi^0$	(3.5 \pm 1.6) $\times 10^{-3}$		DESIG=254
Γ_{17} $2(\pi^+ \pi^-) \pi^0$	(2.9 \pm 1.0) $\times 10^{-3}$		DESIG=37
Γ_{18} $\rho a_2(1320)$	(2.6 \pm 0.9) $\times 10^{-4}$		DESIG=25
Γ_{19} $p\bar{p}$	(2.75 \pm 0.12) $\times 10^{-4}$		DESIG=65
Γ_{20} $\Delta^{++} \bar{\Delta}^{--}$	(1.28 \pm 0.35) $\times 10^{-4}$		DESIG=27
Γ_{21} $\Lambda \bar{\Lambda} \pi^0$	< 2.9 $\times 10^{-6}$	CL=90%	DESIG=70
Γ_{22} $\Lambda \bar{\Lambda} \eta$	(2.5 \pm 0.4) $\times 10^{-5}$		DESIG=238
Γ_{23} $\Lambda \bar{p} K^+$	(1.00 \pm 0.14) $\times 10^{-4}$		DESIG=239
Γ_{24} $\Lambda \bar{p} K^+ \pi^+ \pi^-$	(1.8 \pm 0.4) $\times 10^{-4}$		DESIG=214
Γ_{25} $\Lambda \bar{\Lambda} \pi^+ \pi^-$	(2.8 \pm 0.6) $\times 10^{-4}$		DESIG=215
Γ_{26} $\Lambda \bar{\Lambda}$	(2.8 \pm 0.5) $\times 10^{-4}$		DESIG=213
Γ_{27} $\Sigma^0 \bar{p} K^+ + \text{c.c.}$	(1.67 \pm 0.18) $\times 10^{-5}$		DESIG=28
Γ_{28} $\Sigma^+ \bar{\Sigma}^-$	(2.6 \pm 0.8) $\times 10^{-4}$		DESIG=274
Γ_{29} $\Sigma^0 \bar{\Sigma}^0$	(2.2 \pm 0.4) $\times 10^{-4}$		DESIG=223
Γ_{30} $\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	(1.1 \pm 0.4) $\times 10^{-4}$		DESIG=71
Γ_{31} $\Xi^- \bar{\Xi}^+$	(1.8 \pm 0.6) $\times 10^{-4}$		DESIG=72
Γ_{32} $\Xi^0 \bar{\Xi}^0$	(2.8 \pm 0.9) $\times 10^{-4}$		DESIG=29
Γ_{33} $\Xi(1530)^0 \bar{\Xi}(1530)^0$	< 8.1 $\times 10^{-5}$	CL=90%	DESIG=224
Γ_{34} $\Omega^- \bar{\Omega}^+$	< 7.3 $\times 10^{-5}$	CL=90%	DESIG=73
Γ_{35} $\pi^0 p\bar{p}$	(1.53 \pm 0.07) $\times 10^{-4}$		DESIG=74
Γ_{36} $N(940) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(6.4 \pm 1.8) $\times 10^{-5}$		DESIG=35
Γ_{37} $N(1440) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(7.3 \pm 1.7) $\times 10^{-5}$		DESIG=267
Γ_{38} $N(1520) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(6.4 \pm 2.3) $\times 10^{-6}$		DESIG=261
Γ_{39} $N(1535) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(2.5 \pm 1.0) $\times 10^{-5}$		DESIG=268
Γ_{40} $N(1650) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(3.8 \pm 1.4) $\times 10^{-5}$		DESIG=269
Γ_{41} $N(1720) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(1.79 \pm 0.26) $\times 10^{-5}$		DESIG=270
Γ_{42} $N(2300) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(2.6 \pm 1.2) $\times 10^{-5}$		DESIG=271
Γ_{43} $N(2570) \bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p}$	(2.13 \pm 0.40) $\times 10^{-5}$		DESIG=272
Γ_{44} $\pi^0 f_0(2100) \rightarrow \pi^0 p\bar{p}$	(1.1 \pm 0.4) $\times 10^{-5}$		DESIG=273
Γ_{45} $\eta p\bar{p}$	(5.7 \pm 0.6) $\times 10^{-5}$		DESIG=262
Γ_{46} $\eta f_0(2100) \rightarrow \eta p\bar{p}$	(1.2 \pm 0.4) $\times 10^{-5}$		DESIG=200
Γ_{47} $N(1535) \bar{p} \rightarrow \eta p\bar{p}$	(4.4 \pm 0.7) $\times 10^{-5}$		DESIG=263
Γ_{48} $\omega p\bar{p}$	(6.9 \pm 2.1) $\times 10^{-5}$		DESIG=264
Γ_{49} $\phi p\bar{p}$	< 2.4 $\times 10^{-5}$	CL=90%	DESIG=77
Γ_{50} $\pi^+ \pi^- p\bar{p}$	(6.0 \pm 0.4) $\times 10^{-4}$		DESIG=80
Γ_{51} $p\bar{n} \pi^-$ or c.c.	(2.48 \pm 0.17) $\times 10^{-4}$		DESIG=31

Γ_{52}	$p\bar{n}\pi^-\pi^0$	(3.2 \pm 0.7) $\times 10^{-4}$	DESIG=228
Γ_{53}	$2(\pi^+\pi^-\pi^0)$	(4.7 \pm 1.5) $\times 10^{-3}$	DESIG=221
Γ_{54}	$\eta\pi^+\pi^-$	< 1.6 $\times 10^{-4}$	CL=90% DESIG=202
Γ_{55}	$\eta\pi^+\pi^-\pi^0$	(9.5 \pm 1.7) $\times 10^{-4}$	DESIG=203
Γ_{56}	$2(\pi^+\pi^-)\eta$	(1.2 \pm 0.6) $\times 10^{-3}$	DESIG=251
Γ_{57}	$\eta'\pi^+\pi^-\pi^0$	(4.5 \pm 2.1) $\times 10^{-4}$	DESIG=204
Γ_{58}	$\omega\pi^+\pi^-$	(7.3 \pm 1.2) $\times 10^{-4}$	S=2.1 DESIG=75
Γ_{59}	$b_1^\pm\pi^\mp$	(4.0 \pm 0.6) $\times 10^{-4}$	S=1.1 DESIG=40
Γ_{60}	$b_1^0\pi^0$	(2.4 \pm 0.6) $\times 10^{-4}$	DESIG=193
Γ_{61}	$\omega f_2(1270)$	(2.2 \pm 0.4) $\times 10^{-4}$	DESIG=64
Γ_{62}	$\pi^+\pi^-K^+K^-$	(7.5 \pm 0.9) $\times 10^{-4}$	S=1.9 DESIG=26
Γ_{63}	$\rho^0K^+K^-$	(2.2 \pm 0.4) $\times 10^{-4}$	DESIG=205
Γ_{64}	$K^*(892)^0\bar{K}_2^*(1430)^0$	(1.9 \pm 0.5) $\times 10^{-4}$	DESIG=66
Γ_{65}	$K^+K^-\pi^+\pi^-\eta$	(1.3 \pm 0.7) $\times 10^{-3}$	DESIG=252
Γ_{66}	$K^+K^-2(\pi^+\pi^-)\pi^0$	(1.00 \pm 0.31) $\times 10^{-3}$	DESIG=240
Γ_{67}	$K^+K^-2(\pi^+\pi^-)$	(1.9 \pm 0.9) $\times 10^{-3}$	DESIG=222
Γ_{68}	$K_1(1270)^\pm K^\mp$	(1.00 \pm 0.28) $\times 10^{-3}$	DESIG=41
Γ_{69}	$K_S^0K_S^0\pi^+\pi^-$	(2.2 \pm 0.4) $\times 10^{-4}$	DESIG=225
Γ_{70}	$\rho^0p\bar{p}$	(5.0 \pm 2.2) $\times 10^{-5}$	DESIG=210
Γ_{71}	$K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	(6.7 \pm 2.5) $\times 10^{-4}$	DESIG=34
Γ_{72}	$2(\pi^+\pi^-)$	(2.4 \pm 0.6) $\times 10^{-4}$	S=2.2 DESIG=24
Γ_{73}	$\rho^0\pi^+\pi^-$	(2.2 \pm 0.6) $\times 10^{-4}$	S=1.4 DESIG=33
Γ_{74}	$K^+K^-\pi^+\pi^-\pi^0$	(1.26 \pm 0.09) $\times 10^{-3}$	DESIG=206
Γ_{75}	$\omega f_0(1710) \rightarrow \omega K^+K^-$	(5.9 \pm 2.2) $\times 10^{-5}$	DESIG=216
Γ_{76}	$K^*(892)^0K^-\pi^+\pi^0 + \text{c.c.}$	(8.6 \pm 2.2) $\times 10^{-4}$	DESIG=217
Γ_{77}	$K^*(892)^+K^-\pi^+\pi^- + \text{c.c.}$	(9.6 \pm 2.8) $\times 10^{-4}$	DESIG=218
Γ_{78}	$K^*(892)^+K^-\rho^0 + \text{c.c.}$	(7.3 \pm 2.6) $\times 10^{-4}$	DESIG=219
Γ_{79}	$K^*(892)^0K^-\rho^+ + \text{c.c.}$	(6.1 \pm 1.8) $\times 10^{-4}$	DESIG=220
Γ_{80}	$\eta K^+K^-, \text{ no } \eta\phi$	(3.1 \pm 0.4) $\times 10^{-5}$	DESIG=207
Γ_{81}	ωK^+K^-	(1.85 \pm 0.25) $\times 10^{-4}$	S=1.1 DESIG=76
Γ_{82}	$3(\pi^+\pi^-)$	(3.5 \pm 2.0) $\times 10^{-4}$	S=2.8 DESIG=32
Γ_{83}	$p\bar{p}\pi^+\pi^-\pi^0$	(7.3 \pm 0.7) $\times 10^{-4}$	DESIG=211
Γ_{84}	K^+K^-	(7.1 \pm 0.5) $\times 10^{-5}$	S=1.5 DESIG=23
Γ_{85}	$K_S^0K_L^0$	(5.34 \pm 0.33) $\times 10^{-5}$	DESIG=85
Γ_{86}	$\pi^+\pi^-\pi^0$	(2.01 \pm 0.17) $\times 10^{-4}$	S=1.7 DESIG=36
Γ_{87}	$\rho(2150)\pi \rightarrow \pi^+\pi^-\pi^0$	(1.9 \pm 1.2) $\times 10^{-4}$	DESIG=201
Γ_{88}	$\rho(770)\pi \rightarrow \pi^+\pi^-\pi^0$	(3.2 \pm 1.2) $\times 10^{-5}$	S=1.8 DESIG=22
Γ_{89}	$\pi^+\pi^-$	(7.8 \pm 2.6) $\times 10^{-6}$	DESIG=21
Γ_{90}	$K_1(1400)^\pm K^\mp$	< 3.1 $\times 10^{-4}$	CL=90% DESIG=42
Γ_{91}	$K_2^*(1430)^\pm K^\mp$	(7.1 \pm 1.3) $\times 10^{-5}$	DESIG=265
Γ_{92}	$K^+K^-\pi^0$	(4.07 \pm 0.31) $\times 10^{-5}$	DESIG=38
Γ_{93}	$K^+K^*(892)^- + \text{c.c.}$	(2.9 \pm 0.4) $\times 10^{-5}$	S=1.2 DESIG=39
Γ_{94}	$K^*(892)^0\bar{K}^0 + \text{c.c.}$	(1.09 \pm 0.20) $\times 10^{-4}$	DESIG=194
Γ_{95}	$\phi\pi^+\pi^-$	(1.17 \pm 0.29) $\times 10^{-4}$	S=1.7 DESIG=78
Γ_{96}	$\phi f_0(980) \rightarrow \pi^+\pi^-$	(6.8 \pm 2.4) $\times 10^{-5}$	S=1.1 DESIG=81
Γ_{97}	$2(K^+K^-)$	(6.0 \pm 1.4) $\times 10^{-5}$	DESIG=208
Γ_{98}	ϕK^+K^-	(7.0 \pm 1.6) $\times 10^{-5}$	DESIG=79
Γ_{99}	$2(K^+K^-)\pi^0$	(1.10 \pm 0.28) $\times 10^{-4}$	DESIG=209
Γ_{100}	$\phi\eta$	(3.10 \pm 0.31) $\times 10^{-5}$	DESIG=89
Γ_{101}	$\phi\eta'$	(3.1 \pm 1.6) $\times 10^{-5}$	DESIG=90
Γ_{102}	$\omega\eta'$	(3.2 \pm 2.5) $\times 10^{-5}$	DESIG=91
Γ_{103}	$\omega\pi^0$	(2.1 \pm 0.6) $\times 10^{-5}$	DESIG=92
Γ_{104}	$\rho\eta'$	(1.9 \pm 1.7) $\times 10^{-5}$	DESIG=93
Γ_{105}	$\rho\eta$	(2.2 \pm 0.6) $\times 10^{-5}$	S=1.1 DESIG=94
Γ_{106}	$\omega\eta$	< 1.1 $\times 10^{-5}$	CL=90% DESIG=95

Γ_{107}	$\phi\pi^0$	$< 4 \times 10^{-7}$	CL=90%	DESIG=96
Γ_{108}	$\eta_c\pi^+\pi^-\pi^0$	$< 1.0 \times 10^{-3}$	CL=90%	DESIG=229
Γ_{109}	$p\bar{p}K^+K^-$	$(2.7 \pm 0.7) \times 10^{-5}$		DESIG=212
Γ_{110}	$\Lambda n K_S^0 + \text{c.c.}$	$(8.1 \pm 1.8) \times 10^{-5}$		DESIG=237
Γ_{111}	$\phi f'_2(1525)$	$(4.4 \pm 1.6) \times 10^{-5}$		DESIG=67
Γ_{112}	$\Theta(1540)\bar{\Theta}(1540) \rightarrow K_S^0 p K^- \bar{n} + \text{c.c.}$	$< 8.8 \times 10^{-6}$	CL=90%	DESIG=195
Γ_{113}	$\Theta(1540)K^-\bar{n} \rightarrow K_S^0 p K^- \bar{n}$	$< 1.0 \times 10^{-5}$	CL=90%	DESIG=196
Γ_{114}	$\Theta(1540)K_S^0\bar{p} \rightarrow K_S^0\bar{p}K^+n$	$< 7.0 \times 10^{-6}$	CL=90%	DESIG=197
Γ_{115}	$\bar{\Theta}(1540)K^+n \rightarrow K_S^0\bar{p}K^+n$	$< 2.6 \times 10^{-5}$	CL=90%	DESIG=198
Γ_{116}	$\bar{\Theta}(1540)K_S^0p \rightarrow K_S^0pK^-\bar{n}$	$< 6.0 \times 10^{-6}$	CL=90%	DESIG=199
Γ_{117}	$K_S^0 K_S^0$	$< 4.6 \times 10^{-6}$		DESIG=86

Radiative decays

Γ_{118}	$\gamma\chi_{c0}(1P)$	$(9.84 \pm 0.31) \%$		NODE=M071;CLUMP=C
Γ_{119}	$\gamma\chi_{c1}(1P)$	$(9.3 \pm 0.4) \%$		DESIG=58
Γ_{120}	$\gamma\chi_{c2}(1P)$	$(8.76 \pm 0.34) \%$		DESIG=59
Γ_{121}	$\gamma\eta_c(1S)$	$(3.4 \pm 0.5) \times 10^{-3}$	S=1.3	DESIG=61
Γ_{122}	$\gamma\eta_c(2S)$	$(7 \pm 5) \times 10^{-4}$		DESIG=63
Γ_{123}	$\gamma\pi^0$	$(1.6 \pm 0.4) \times 10^{-6}$		DESIG=52
Γ_{124}	$\gamma\eta'(958)$	$(1.23 \pm 0.06) \times 10^{-4}$		DESIG=54
Γ_{125}	$\gamma f_2(1270)$	$(2.1 \pm 0.4) \times 10^{-4}$		DESIG=82
Γ_{126}	$\gamma f_0(1710)$			DESIG=236
Γ_{127}	$\gamma f_0(1710) \rightarrow \gamma\pi\pi$	$(3.0 \pm 1.3) \times 10^{-5}$		DESIG=83
Γ_{128}	$\gamma f_0(1710) \rightarrow \gamma K\bar{K}$	$(6.0 \pm 1.6) \times 10^{-5}$		DESIG=84
Γ_{129}	$\gamma\gamma$	$< 1.4 \times 10^{-4}$	CL=90%	DESIG=51
Γ_{130}	$\gamma\eta$	$(1.4 \pm 0.5) \times 10^{-6}$		DESIG=53
Γ_{131}	$\gamma\eta\pi^+\pi^-$	$(8.7 \pm 2.1) \times 10^{-4}$		DESIG=230
Γ_{132}	$\gamma\eta(1405)$			DESIG=231
Γ_{133}	$\gamma\eta(1405) \rightarrow \gamma K\bar{K}\pi$	$< 9 \times 10^{-5}$	CL=90%	DESIG=62
Γ_{134}	$\gamma\eta(1405) \rightarrow \eta\pi^+\pi^-$	$(3.6 \pm 2.5) \times 10^{-5}$		DESIG=232
Γ_{135}	$\gamma\eta(1475)$			DESIG=233
Γ_{136}	$\gamma\eta(1475) \rightarrow K\bar{K}\pi$	$< 1.4 \times 10^{-4}$	CL=90%	DESIG=234
Γ_{137}	$\gamma\eta(1475) \rightarrow \eta\pi^+\pi^-$	$< 8.8 \times 10^{-5}$	CL=90%	DESIG=235
Γ_{138}	$\gamma 2(\pi^+\pi^-)$	$(4.0 \pm 0.6) \times 10^{-4}$		DESIG=241
Γ_{139}	$\gamma K^{*0}K^+\pi^- + \text{c.c.}$	$(3.7 \pm 0.9) \times 10^{-4}$		DESIG=242
Γ_{140}	$\gamma K^{*0}\bar{K}^{*0}$	$(2.4 \pm 0.7) \times 10^{-4}$		DESIG=243
Γ_{141}	$\gamma K_S^0K^+\pi^- + \text{c.c.}$	$(2.6 \pm 0.5) \times 10^{-4}$		DESIG=244
Γ_{142}	$\gamma K^+K^-\pi^+\pi^-$	$(1.9 \pm 0.5) \times 10^{-4}$		DESIG=245
Γ_{143}	$\gamma p\bar{p}$	$(3.9 \pm 0.5) \times 10^{-5}$	S=2.0	DESIG=246
Γ_{144}	$\gamma f_2(1950) \rightarrow \gamma p\bar{p}$	$(1.20 \pm 0.22) \times 10^{-5}$		DESIG=257
Γ_{145}	$\gamma f_2(2150) \rightarrow \gamma p\bar{p}$	$(7.2 \pm 1.8) \times 10^{-6}$		DESIG=258
Γ_{146}	$\gamma X(1835) \rightarrow \gamma p\bar{p}$	$(4.6 \pm 1.8) \times 10^{-6}$		DESIG=259
Γ_{147}	$\gamma X \rightarrow \gamma p\bar{p}$	$[a] < 2 \times 10^{-6}$	CL=90%	DESIG=260
Γ_{148}	$\gamma\pi^+\pi^-p\bar{p}$	$(2.8 \pm 1.4) \times 10^{-5}$		DESIG=247
Γ_{149}	$\gamma 2(\pi^+\pi^-)K^+K^-$	$< 2.2 \times 10^{-4}$	CL=90%	DESIG=248
Γ_{150}	$\gamma 3(\pi^+\pi^-)$	$< 1.7 \times 10^{-4}$	CL=90%	DESIG=249
Γ_{151}	$\gamma K^+K^-K^+K^-$	$< 4 \times 10^{-5}$	CL=90%	DESIG=250
Γ_{152}	$\gamma\gamma J/\psi$	$(3.1 \pm 1.0) \times 10^{-4}$		DESIG=266

[a] For a narrow resonance in the range $2.2 < M(X) < 2.8$ GeV.

LINKAGE=NMR

CONSTRAINED FIT INFORMATION

A multiparticle fit to $\chi_{c1}(1P)$, $\chi_{c0}(1P)$, $\chi_{c2}(1P)$, and $\psi(2S)$ with 4 total widths, a partial width, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 227 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 325.4$ for 178 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta p_i \delta p_j \rangle / (\delta p_i \delta p_j)$, in percent, from the fit to parameters p_i , including the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$.

	x_7	4								
	x_8	1	0							
	x_{11}	39	11	3						
	x_{12}	36	7	2	61					
	x_{13}	21	5	1	47	27				
	x_{19}	2	1	0	7	5	3			
	x_{118}	1	0	0	3	2	1	0		
	x_{119}	2	0	0	4	2	2	0	0	
	x_{120}	2	1	0	5	3	2	0	0	0
Γ	-80	-6	-1	-51	-44	-26	-9	-2	-2	-3
	x_6	x_7	x_8	x_{11}	x_{12}	x_{13}	x_{19}	x_{118}	x_{119}	x_{120}

$\psi(2S)$ PARTIAL WIDTHS

$\Gamma(\text{hadrons})$

VALUE (keV)	DOCUMENT ID	TECN	COMMENT	Γ_1
-------------	-------------	------	---------	------------

• • • We do not use the following data for averages, fits, limits, etc. • • •

258±26	BAI	02B	BES2 $e^+ e^-$	
224±56	LUTH	75	MRK1 $e^+ e^-$	

$\Gamma(e^+ e^-)$

VALUE (keV)	DOCUMENT ID	TECN	COMMENT	Γ_6
-------------	-------------	------	---------	------------

2.37 ±0.04 OUR FIT
[2.35 ± 0.04 keV OUR 2012 FIT]

2.33 ±0.07 OUR AVERAGE

2.338±0.037±0.096	ABLIKIM	08B	BES2 $e^+ e^- \rightarrow \text{hadrons}$	
2.330±0.036±0.110	ABLIKIM	06L	BES2 $e^+ e^- \rightarrow \text{hadrons}$	
2.44 ±0.21	¹ BAI	02B	BES2 $e^+ e^-$	
2.14 ±0.21	ALEXANDER	89	RVUE See γ mini-review	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.0 ±0.3	BRANDELIK	79C	DASP $e^+ e^-$	
2.1 ±0.3	² LUTH	75	MRK1 $e^+ e^-$	

¹ From a simultaneous fit to $e^+ e^-$, $\mu^+ \mu^-$, and hadronic channel, assuming $\Gamma_e = \Gamma_\mu = \Gamma_\tau / 0.38847$.

² From a simultaneous fit to $e^+ e^-$, $\mu^+ \mu^-$, and hadronic channels assuming $\Gamma(e^+ e^-) = \Gamma(\mu^+ \mu^-)$.

$\Gamma(\gamma\gamma)$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT	Γ_{129}
<43	90	BRANDELIK	79C	DASP $e^+ e^-$	

$\psi(2S) \Gamma(i) \Gamma(e^+ e^-) / \Gamma(\text{total})$

This combination of a partial width with the partial width into $e^+ e^-$ and with the total width is obtained from the integrated cross section into channel(i) in the $e^+ e^-$ annihilation. We list only data that have not been used to determine the partial width $\Gamma(i)$ or the branching ratio $\Gamma(i)/\Gamma_{\text{total}}$.

$\Gamma(\text{hadrons}) \times \Gamma(e^+ e^-) / \Gamma_{\text{total}}$

VALUE (keV)	DOCUMENT ID	TECN	COMMENT	$\Gamma_1 \Gamma_6 / \Gamma$
-------------	-------------	------	---------	------------------------------

2.233±0.015±0.042	¹ ANASHIN	12	KEDR $e^+ e^- \rightarrow \text{hadrons}$	
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• • • We do not use the following data for averages, fits, limits, etc. • • •

2.2 ±0.4	ABRAMS	75	MRK1 $e^+ e^-$	
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NODE=M071225

NODE=M071W3
NODE=M071W3

NODE=M071W1
NODE=M071W1
NEW

NODE=M071W;LINKAGE=BB

NODE=M071W1;LINKAGE=F

NODE=M071W51
NODE=M071W51

NODE=M071230

NODE=M071230

NODE=M071G3
NODE=M071G3

¹ ANASHIN 12 reports the value $2.233 \pm 0.015 \pm 0.037 \pm 0.020$ keV, where the third uncertainty is due to assumptions on the interference between the resonance and hadronic continuum. We combined the two systematic uncertainties.

$\Gamma(\tau^+\tau^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$	$\Gamma_8\Gamma_6/\Gamma$			
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

9.0 ± 2.6 79 ¹ ANASHIN 07 KEDR $e^+e^- \rightarrow \psi(2S) \rightarrow \tau^+\tau^-$

¹ Using $\psi(2S)$ total width of 337 ± 13 keV. Systematic errors not evaluated.

$\Gamma(J/\psi(1S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$	$\Gamma_{11}\Gamma_6/\Gamma$			
VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT

0.807±0.014 OUR FIT

[0.789 ± 0.015 keV OUR 2012 FIT]

0.839±0.025 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.
[0.82 ± 0.04 keV OUR 2012 AVERAGE Scale factor = 1.6]

$0.842 \pm 0.028 \pm 0.009$ 1 LEES 12E BABR $10.6 e^+e^- \rightarrow 2\pi^+2\pi^-\gamma$

$0.852 \pm 0.010 \pm 0.026$ 19.5k ADAM 06 CLEO $3.773 e^+e^- \rightarrow \gamma\psi(2S)$

0.68 ± 0.09 2 BAI 98E BES e^+e^-

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.88 \pm 0.08 \pm 0.03$ 256 ³ AUBERT 07AU BABR $10.6 e^+e^- \rightarrow J/\psi\pi^+\pi^-\gamma$

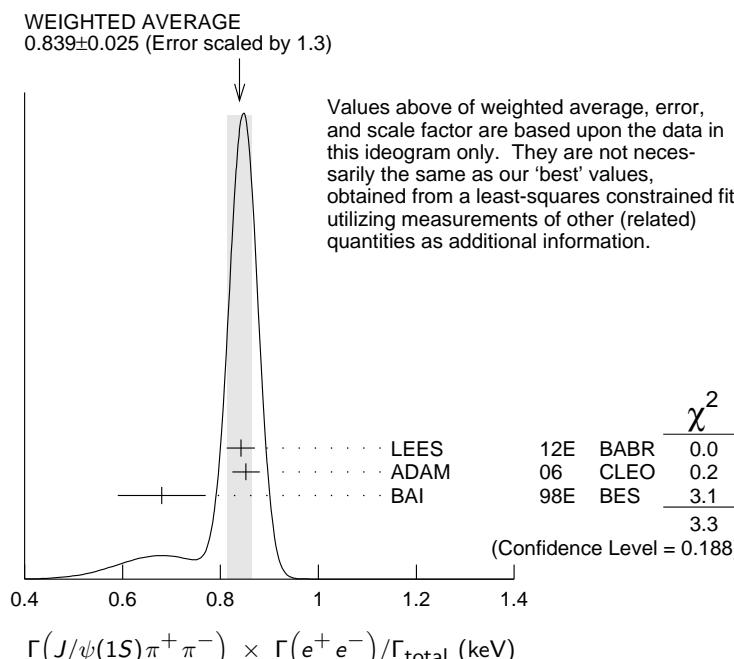
$0.76 \pm 0.05 \pm 0.01$ 544 ⁴ AUBERT 05D BABR $10.6 e^+e^- \rightarrow \pi^+\pi^-\mu^+\mu^-\gamma$

¹ LEES 12E reports $[\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow \mu^+\mu^-)] = (49.9 \pm 1.3 \pm 1.0) \times 10^{-3}$ keV which we divide by our best value $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² The value of $\Gamma(e^+e^-)$ quoted in BAI 98E is derived using $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.4 \pm 2.6) \times 10^{-2}$ and $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1203 \pm 0.0038$. Recalculated by us using $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1181 \pm 0.0020$.

³ AUBERT 07AU reports $[\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow \pi^+\pi^-\pi^0)] = 0.0186 \pm 0.0012 \pm 0.0011$ keV which we divide by our best value $B(J/\psi(1S) \rightarrow \pi^+\pi^-\pi^0) = (2.11 \pm 0.07) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

⁴ AUBERT 05D reports $[\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow \mu^+\mu^-)] = 0.0450 \pm 0.0018 \pm 0.0022$ keV which we divide by our best value $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Superseded by LEES 12E.



NODE=M071G3;LINKAGE=AN

NODE=M071G9
NODE=M071G9

NODE=M071G9;LINKAGE=AN

NODE=M071G1
NODE=M071G1
NEW

NEW

NODE=M071G1;LINKAGE=LE

NODE=M071G1;LINKAGE=A

NODE=M071G1;LINKAGE=UB

NODE=M071G1;LINKAGE=AU

$\Gamma(J/\psi(1S)\pi^0\pi^0) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{12}\Gamma_6/\Gamma$
0.425±0.009 OUR FIT [0.417 ± 0.010 keV OUR 2012 FIT]					NODE=M071G6 NODE=M071G6 NEW
0.411±0.008±0.018	3.6k±96	ADAM	06	CLEO	$3.773 e^+ e^- \rightarrow \gamma\psi(2S)$

 $\Gamma(J/\psi(1S)\eta) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{13}\Gamma_6/\Gamma$
79.0±1.7 OUR FIT [77.0 ± 1.9 eV OUR 2012 FIT]					NODE=M071G7 NODE=M071G7 NEW

87 ± 9 OUR AVERAGE

83 ± 25 ± 5	14	¹ AUBERT	07AU	BABR	$10.6 e^+ e^- \rightarrow J/\psi\pi^+\pi^-\pi^0\gamma$
88 ± 6 ± 7	291 ± 24	ADAM	06	CLEO	$3.773 e^+ e^- \rightarrow \gamma\psi(2S)$

¹AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot B(\psi(2S) \rightarrow J/\psi\eta) \cdot B(J/\psi \rightarrow \mu^+\mu^-) \cdot B(\eta \rightarrow \pi^+\pi^-\pi^0) = 1.11 \pm 0.33 \pm 0.07$ eV.

 $\Gamma(J/\psi(1S)\pi^0) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{14}\Gamma_6/\Gamma$
<8	90	<37	ADAM	06	CLEO	$3.773 e^+ e^- \rightarrow \gamma\psi(2S)$

 $\Gamma(p\bar{p}) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{19}\Gamma_6/\Gamma$
0.653±0.028 OUR FIT [0.647 ± 0.028 eV OUR 2012 FIT]					NODE=M071G2 NODE=M071G2 NEW

0.59 ± 0.05 OUR AVERAGE

0.579±0.038±0.036	2.7k	ANDREOTTI	07	E835	$p\bar{p} \rightarrow e^+e^-, J/\psi X$
0.70 ± 0.17 ± 0.03	22	AUBERT	06B		$e^+e^- \rightarrow p\bar{p}\gamma$

 $\Gamma(\Lambda\bar{\Lambda}) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	DOCUMENT ID	TECN	COMMENT	$\Gamma_{26}\Gamma_6/\Gamma$
1.5±0.4±0.1	AUBERT	07BD	BABR	$10.6 e^+e^- \rightarrow \Lambda\bar{\Lambda}\gamma$

 $\Gamma(2(\pi^+\pi^-\pi^0)) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{53}\Gamma_6/\Gamma$
11.2±3.3±1.3	43	AUBERT	06D	BABR	$10.6 e^+e^- \rightarrow 2(\pi^+\pi^-\pi^0)\gamma$

 $\Gamma(K^+K^-2(\pi^+\pi^-)) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{67}\Gamma_6/\Gamma$
4.4±2.1±0.3	26	AUBERT	06D	BABR	$10.6 e^+e^- \rightarrow K^+K^-2(\pi^+\pi^-)\gamma$

 $\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{62}\Gamma_6/\Gamma$
2.56±0.42±0.16	85	AUBERT	07AK	BABR	$10.6 e^+e^- \rightarrow \pi^+\pi^-K^+K^-\gamma$

 $\Gamma(\phi f_0(980) \rightarrow \pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{96}\Gamma_6/\Gamma$
0.347±0.169±0.003	6 ± 3	¹ AUBERT	07AK	BABR	$10.6 e^+e^- \rightarrow \pi^+\pi^-K^+K^-\gamma$

¹AUBERT 07AK reports $[\Gamma(\psi(2S) \rightarrow \phi f_0(980) \rightarrow \pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)] \times [B(\phi(1020) \rightarrow K^+K^-)] = 0.17 \pm 0.08 \pm 0.02$ eV which we divide by our best value $B(\phi(1020) \rightarrow K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\phi\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{95}\Gamma_6/\Gamma$
0.57±0.23±0.01	10	¹ AUBERT,BE	06D	BABR	$10.6 e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$

¹AUBERT,BE 06D reports $[\Gamma(\psi(2S) \rightarrow \phi\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{\text{total}] \times [B(\phi(1020) \rightarrow K^+K^-)] = 0.28 \pm 0.11 \pm 0.02}$ eV which we divide by our best value $B(\phi(1020) \rightarrow K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(2(\pi^+\pi^-)\pi^0) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{17}\Gamma_6/\Gamma$
29.7±2.2±1.8	410	AUBERT	07AU	BABR	$10.6 e^+e^- \rightarrow 2(\pi^+\pi^-)\pi^0\gamma$

NODE=M071G6

NODE=M071G6

NEW

NODE=M071G7;LINKAGE=UB

NODE=M071G8
NODE=M071G8NODE=M071G2
NODE=M071G2
NEWNODE=M071G4
NODE=M071G4NODE=M071G5
NODE=M071G5NODE=M071G13
NODE=M071G13

NODE=M071G10;LINKAGE=AU

NODE=M071G01
NODE=M071G01

$\Gamma(\omega\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$					$\Gamma_{58}\Gamma_6/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
3.01±0.84±0.02	37	1 AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow \omega\pi^+\pi^-\gamma$	
1 AUBERT 07AU reports $[\Gamma(\psi(2S) \rightarrow \omega\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{\text{total}}] \times [B(\omega(782) \rightarrow \pi^+\pi^-\pi^0)] = 2.69 \pm 0.73 \pm 0.16$ eV which we divide by our best value $B(\omega(782) \rightarrow \pi^+\pi^-\pi^0) = (89.2 \pm 0.7) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.					
$\Gamma(2(\pi^+\pi^-)\eta) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$					$\Gamma_{56}\Gamma_6/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
2.87±1.41±0.01	16	1 AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow 2(\pi^+\pi^-)\eta\gamma$	
1 AUBERT 07AU reports $[\Gamma(\psi(2S) \rightarrow 2(\pi^+\pi^-)\eta) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{\text{total}}] \times [B(\eta \rightarrow 2\gamma)] = 1.13 \pm 0.55 \pm 0.08$ eV which we divide by our best value $B(\eta \rightarrow 2\gamma) = (39.41 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.					
$\Gamma(K^+K^-\pi^+\pi^-\pi^0) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$					$\Gamma_{74}\Gamma_6/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
4.4±1.3±0.3	32	AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi^+\pi^-\pi^0\gamma$	
$\Gamma(K^+K^-\pi^+\pi^-\eta) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$					$\Gamma_{65}\Gamma_6/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
3.0 ±1.8 OUR AVERAGE	[3.1 ± 1.8 eV OUR 2012 AVERAGE]				
3.04±1.79±0.02	7	1 AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi^+\pi^-\eta\gamma$	
1 AUBERT 07AU reports $[\Gamma(\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\eta) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{\text{total}}] \times [B(\eta \rightarrow 2\gamma)] = 1.2 \pm 0.7 \pm 0.1$ eV which we divide by our best value $B(\eta \rightarrow 2\gamma) = (39.41 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.					

$\psi(2S)$ BRANCHING RATIOS

$\Gamma(\text{hadrons})/\Gamma_{\text{total}}$					Γ_1/Γ
VALUE	DOCUMENT ID	TECN	COMMENT		
0.9785±0.0013 OUR AVERAGE					
0.9779±0.0015	1 BAI	02B	BES2	e^+e^-	
0.981 ± 0.003	1 LUTH	75	MRK1	e^+e^-	
1 Includes cascade decay into $J/\psi(1S)$.					
$\Gamma(\text{virtual}\gamma \rightarrow \text{hadrons})/\Gamma_{\text{total}}$					Γ_2/Γ
VALUE	DOCUMENT ID	TECN	COMMENT		
0.0173±0.0014 OUR AVERAGE	Error includes scale factor of 1.5.				
0.0166±0.0010	1,2 SETH	04	RVUE	e^+e^-	
0.0199±0.0019	1 BAI	02B	BES2	e^+e^-	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.029 ± 0.004	1 LUTH	75	MRK1	e^+e^-	
1 Included in $\Gamma(\text{hadrons})/\Gamma_{\text{total}}$.					
2 Using $B(\psi(2S) \rightarrow \ell^+\ell^-) = (0.73 \pm 0.04)\%$ from RPP-2002 and $R = 2.28 \pm 0.04$ determined by a fit to data from BAI 00 and BAI 02C.					

$\Gamma(ggg)/\Gamma_{\text{total}}$					Γ_3/Γ
VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT	
10.58±1.62	2.9 M	1 LIBBY	09	CLEO	$\psi(2S) \rightarrow \text{hadrons}$
1 Calculated using $\Gamma(\gamma gg)/\Gamma(ggg) = 0.097 \pm 0.026 \pm 0.016$ from LIBBY 09, $B(\psi(2S) \rightarrow X J/\psi)$ relative and absolute branching fractions from MENDEZ 08, $B(\psi(2S) \rightarrow \gamma\eta_c)$ from MITCHELL 09, and $B(\psi(2S) \rightarrow \text{virtual } \gamma \rightarrow \text{hadrons})$, $B(\psi(2S) \rightarrow \gamma\chi_{cJ})$, and $B(\psi(2S) \rightarrow \ell^+\ell^-)$ from PDG 08. The statistical error is negligible and the systematic error is largely uncorrelated with that of $\Gamma(\gamma gg)/\Gamma_{\text{total}}$ LIBBY 09 measurement.					

$\Gamma(\gamma gg)/\Gamma_{\text{total}}$					Γ_4/Γ
VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT	
1.025±0.288	200 k	1 LIBBY	09	CLEO	$\psi(2S) \rightarrow \gamma + \text{hadrons}$
1 Calculated using $\Gamma(\gamma gg)/\Gamma(ggg) = 0.097 \pm 0.026 \pm 0.016$ from LIBBY 09. The statistical error is negligible and the systematic error is largely uncorrelated with that of $\Gamma(ggg)/\Gamma_{\text{total}}$ LIBBY 09 measurement.					

NODE=M071G02

NODE=M071G02

NODE=M071G02;LINKAGE=UB

NODE=M071G03

NODE=M071G03

NODE=M071G03;LINKAGE=UB

NODE=M071G04

NODE=M071G04

NODE=M071G05

NODE=M071G05

NEW

NODE=M071G05;LINKAGE=UB

NODE=M071235

NODE=M071R3

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NODE=M071R;LINKAGE=P

NODE=M071R5

NODE=M071R5

NODE=M071R;LINKAGE=Z

NODE=M071R5;LINKAGE=SE

NODE=M071S43

NODE=M071S43

NODE=M071S43;LINKAGE=LI

NODE=M071S44

NODE=M071S44

NODE=M071S44;LINKAGE=LI

$\Gamma(\gamma gg)/\Gamma(ggg)$

<u>VALUE</u> (units 10^{-2})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_4/Γ_3
$9.7 \pm 2.6 \pm 1.6$	2.9 M	LIBBY	09	CLEO $\psi(2S) \rightarrow (\gamma +)$ hadrons	

 $\Gamma(\text{light hadrons})/\Gamma_{\text{total}}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_5/Γ
0.154 ± 0.015	1 MENDEZ	08	CLEO $e^+ e^- \rightarrow \psi(2S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				

0.169 \pm 0.026 2 ADAM 05A CLEO $e^+ e^- \rightarrow \psi(2S)$ 1 Uses $B(\psi(2S) \rightarrow J/\psi X)$ from MENDEZ 08 and other branching fractions from PDG 07.2 Uses $B(J/\psi X)$ from ADAM 05A, $B(\chi_c J/\psi)$, $B(\eta_c \gamma)$ from ATHAR 04 and $B(\ell^+ \ell^-)$ from PDG 04. Superseded by MENDEZ 08. $\Gamma(e^+ e^-)/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-4})	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_6/Γ
78.2 ± 1.7 OUR FIT				

[(77.3 ± 1.7) $\times 10^{-4}$ OUR 2012 FIT]

• • • We do not use the following data for averages, fits, limits, etc. • • •

88 \pm 13 1 FELDMAN 77 RVUE $e^+ e^-$ 1 From an overall fit assuming equal partial widths for $e^+ e^-$ and $\mu^+ \mu^-$. For a measurement of the ratio see the entry $\Gamma(\mu^+ \mu^-)/\Gamma(e^+ e^-)$ below. Includes LUTH 75, HILGER 75, BURMESTER 77. $\Gamma(\mu^+ \mu^-)/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-4})	<u>DOCUMENT ID</u>
78 ± 9 OUR FIT	

[(77 ± 8) $\times 10^{-4}$ OUR 2012 FIT] $\Gamma(\mu^+ \mu^-)/\Gamma(e^+ e^-)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_7/Γ_6
1.00 ± 0.11 OUR FIT				

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.89 \pm 0.16 BOYARSKI 75C MRK1 $e^+ e^-$ $\Gamma(\tau^+ \tau^-)/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-4})	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_8/Γ
31 ± 4 OUR FIT				

[(30 ± 4) $\times 10^{-4}$ OUR 2012 FIT] **$30.8 \pm 2.1 \pm 3.8$** 1 ABLIKIM 06W BES $e^+ e^- \rightarrow \psi(2S)$ 1 Computed using PDG 02 value of $B(\psi(2S) \rightarrow \text{hadrons}) = 0.9810 \pm 0.0030$ to estimate the total number of $\psi(2S)$ events.**— DECAYS INTO $J/\psi(1S)$ AND ANYTHING —** $\Gamma(J/\psi(1S)\text{anything})/\Gamma_{\text{total}}$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_9/Γ
0.603 ± 0.007 OUR FIT					

[0.595 ± 0.008 OUR 2012 FIT] **0.55 ± 0.07 OUR AVERAGE**0.51 \pm 0.12 BRANDELIK 79C DASP $e^+ e^- \rightarrow \mu^+ \mu^- X$
0.57 \pm 0.08 ABRAMS 75B MRK1 $e^+ e^- \rightarrow \mu^+ \mu^- X$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.6254 \pm 0.0016 \pm 0.0155 1.1M 1 MENDEZ 08 CLEO $\psi(2S) \rightarrow \ell^+ \ell^- X$
0.5950 \pm 0.0015 \pm 0.0190 151k ADAM 05A CLEO Repl. by MENDEZ 08

1 Not independent from other measurements of MENDEZ 08.

 $\Gamma(e^+ e^-)/\Gamma(J/\psi(1S)\text{anything})$

$$\Gamma_6/\Gamma_9 = \Gamma_6/(\Gamma_{11} + \Gamma_{12} + \Gamma_{13} + 0.348\Gamma_{119} + 0.198\Gamma_{120})$$

<u>VALUE</u> (units 10^{-2})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_9/Γ
1.298 ± 0.026 OUR FIT					

[(1.299 ± 0.026) $\times 10^{-2}$ OUR 2012 FIT] **1.28 ± 0.04 OUR AVERAGE** Error includes scale factor of 1.6. See the ideogram below.1.22 \pm 0.02 \pm 0.05 5097 \pm 73 1 ANDREOTTI 05 E835 $p\bar{p} \rightarrow \psi(2S) \rightarrow e^+ e^-$
1.28 \pm 0.03 \pm 0.02 1 AMBROGIANI 00A E835 $p\bar{p} \rightarrow \psi(2S)$
1.44 \pm 0.08 \pm 0.02 1 ARMSTRONG 97 E760 $\bar{p}p \rightarrow \psi(2S)$ NODE=M071S45
NODE=M071S45NODE=M071S27
NODE=M071S27NODE=M071S27;LINKAGE=ME
NODE=M071S27;LINKAGE=ADNODE=M071R1
NODE=M071R1
NEW

NODE=M071R;LINKAGE=L

NODE=M071R2
NODE=M071R2
NEWNODE=M071R4
NODE=M071R4NODE=M071R75
NODE=M071R75
NEW

NODE=M071R75;LINKAGE=AB

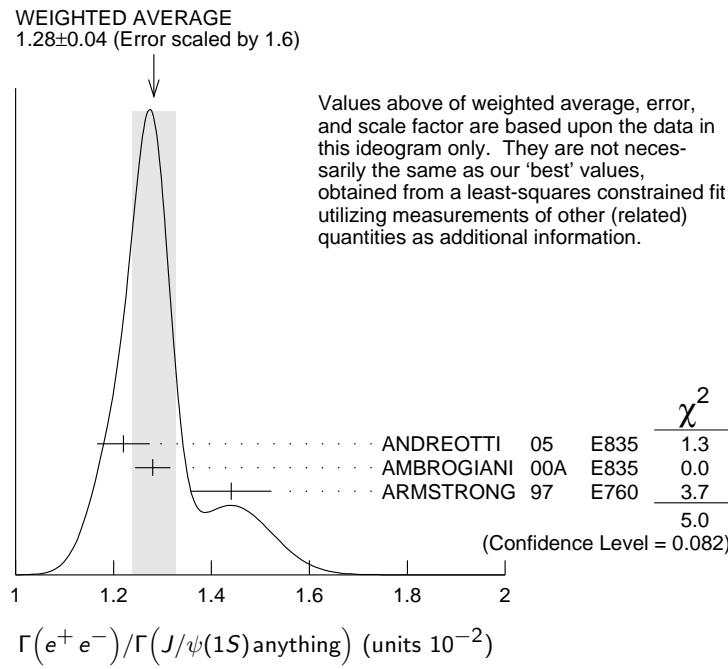
NODE=M071305
NODE=M071R10
NODE=M071R10
NEW

NODE=M071R10;LINKAGE=ME

NODE=M071R72
NODE=M071R72
NEW

¹ Using $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.0593 \pm 0.0010$.

NODE=M071R;LINKAGE=7A



$\Gamma(\mu^+ \mu^-)/\Gamma(J/\psi(1S)\text{anything})$

$$\Gamma_7/\Gamma_9 = \Gamma_7/(\Gamma_{11} + \Gamma_{12} + \Gamma_{13} + 0.348\Gamma_{119} + 0.198\Gamma_{120})$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.0130±0.0014 OUR FIT			
0.014 ± 0.003	HILGER	75	SPEC $e^+ e^-$

NODE=M071R74
NODE=M071R74

$\Gamma(J/\psi(1S)\text{ neutrals})/\Gamma_{\text{total}}$

VALUE	DOCUMENT ID
0.249±0.004 OUR FIT [0.246 ± 0.004 OUR 2012 FIT]	

Γ_{10}/Γ

NODE=M071R18
NODE=M071R18
NEW

$\Gamma(J/\psi(1S)\pi^+\pi^-)/\Gamma_{\text{total}}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.340 ± 0.004 OUR FIT [0.336 ± 0.004 OUR 2012 FIT]				
0.343 ± 0.011 OUR AVERAGE				Error includes scale factor of 1.7.

0.3504±0.0007±0.0077	565k	MENDEZ	08	CLEO $\psi(2S) \rightarrow \ell^+ \ell^- \pi^+ \pi^-$
0.323 ± 0.014		BAI	02B	BES2 $e^+ e^-$
0.32 ± 0.04		ABRAMS	75B	MRK1 $e^+ e^- \rightarrow J/\psi \pi^+ \pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.3354±0.0014±0.0110	60k	¹ ADAM	05A	CLEO Repl. by MENDEZ 08

¹ Not independent from other values reported by ADAM 05A.

NODE=M071R12
NODE=M071R12
NEW

$\Gamma(e^+ e^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$

VALUE	DOCUMENT ID	TECN	COMMENT
0.0230±0.0005 OUR FIT			
0.0252±0.0028±0.0011	¹ AUBERT	02B	BABR $e^+ e^-$

NODE=M071R;LINKAGE=AD

¹ Using $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.0593 \pm 0.0010$.

Γ_6/Γ_{11}

NODE=M071R73
NODE=M071R73

$\Gamma(\mu^+ \mu^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$

VALUE	DOCUMENT ID	TECN	COMMENT
0.0229±0.0025 OUR FIT			
0.0224±0.0029 OUR AVERAGE			

NODE=M071R73;LINKAGE=7A

0.0216±0.0026±0.0014	¹ AUBERT	02B	BABR $e^+ e^-$
0.0327±0.0077±0.0072	¹ GRIBUSHIN	96	FMPS 515 $\pi^- \text{Be} \rightarrow 2\mu X$

NODE=M071R63
NODE=M071R63

¹ Using $B(J/\psi(1S) \rightarrow \mu^+ \mu^-) = 0.0588 \pm 0.0010$.

Γ_7/Γ_{11}

NODE=M071R;LINKAGE=Q2

$\Gamma(r^+ r^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
9.0 ± 1.1 OUR FIT			
8.73±1.39±1.57	BAI	02	BES $e^+ e^-$

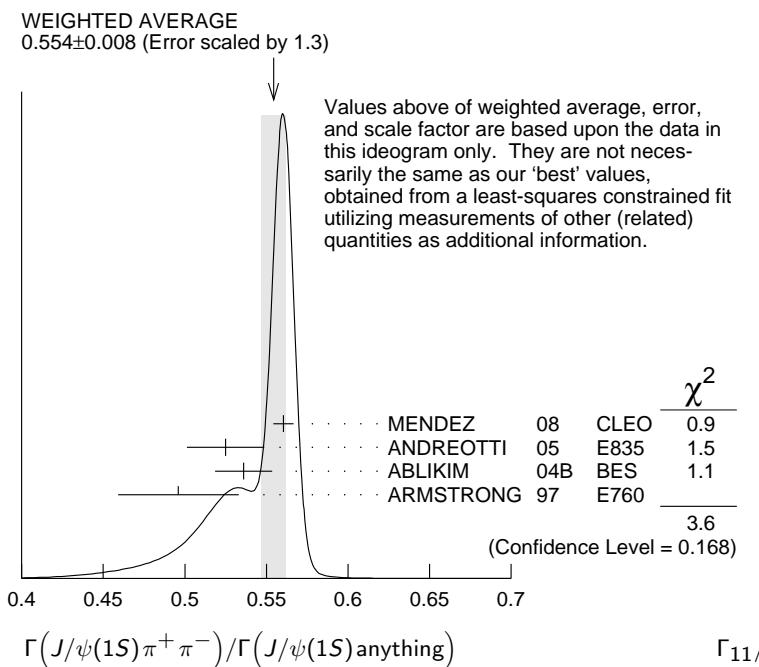
NODE=M071R76
NODE=M071R76

$\Gamma(J/\psi(1S)\pi^+\pi^-)/\Gamma(J/\psi(1S)\text{anything})$ Γ_{11}/Γ_9

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.5648 ± 0.0026 OUR FIT [0.5646 ± 0.0026 OUR 2012 FIT]				
0.554 ± 0.008 OUR AVERAGE				Error includes scale factor of 1.3. See the ideogram below.
0.5604 ± 0.0009 ± 0.0062	565k	MENDEZ 08	CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- \pi^+ \pi^-$
0.525 ± 0.009 ± 0.022	4k	ANDREOTTI 05	E835	$\psi(2S) \rightarrow J/\psi X$
0.536 ± 0.007 ± 0.016	20k	1,2 ABLIKIM 04B	BES	$\psi(2S) \rightarrow J/\psi X$
0.496 ± 0.037		ARMSTRONG 97	E760	$\bar{p}p \rightarrow \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.5637 ± 0.0027 ± 0.0046	60k	ADAM 05A	CLEO	Repl. by MENDEZ 08

1 From a fit to the J/ψ recoil mass spectra.

2 ABLIKIM 04B quotes $B(\psi(2S) \rightarrow J/\psi X) / B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-)$.



$$\Gamma(J/\psi(1S)\pi^+\pi^-)/\Gamma(J/\psi(1S)\text{anything}) \quad \Gamma_{11}/\Gamma_9$$

$\Gamma(J/\psi(1S)\text{ neutrals})/\Gamma(J/\psi(1S)\pi^+\pi^-)$

$$\Gamma_{10}/\Gamma_{11} = (0.9761\Gamma_{12} + 0.719\Gamma_{13} + 0.348\Gamma_{119} + 0.198\Gamma_{120})/\Gamma_{11}$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.730 ± 0.008 OUR FIT [0.731 ± 0.008 OUR 2012 FIT]				
0.73 ± 0.09		TANENBAUM 76	MRK1	$e^+ e^-$

$\Gamma(J/\psi(1S)\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_{12}/Γ_9

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.1793 ± 0.0033 OUR FIT [0.1775 ± 0.0034 OUR 2012 FIT]				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.1769 ± 0.0008 ± 0.0053	61k	1 MENDEZ 08	CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- 2\pi^0$
0.1652 ± 0.0014 ± 0.0058	13.4k	2 ADAM 05A	CLEO	Repl. by MENDEZ 08

1 Not independent from other measurements of MENDEZ 08.

2 Not independent from other values reported by ADAM 05A.

NODE=M071R70

NODE=M071R70

NEW

NODE=M071R;LINKAGE=AB

NODE=M071R;LINKAGE=AL

$\Gamma(J/\psi(1S)\pi^0\pi^0)/\Gamma(J/\psi(1S)\text{anything})$ Γ_{12}/Γ_9

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.2975 ± 0.0031 OUR FIT [0.2982 ± 0.0032 OUR 2012 FIT]				
0.320 ± 0.012 OUR AVERAGE				
0.300 ± 0.008 ± 0.022	1655 ± 44	ANDREOTTI 05	E835	$\psi(2S) \rightarrow J/\psi X$
0.328 ± 0.013 ± 0.008		AMBROGIANI 00A	E835	$p\bar{p} \rightarrow \psi(2S)$
0.323 ± 0.033		ARMSTRONG 97	E760	$\bar{p}p \rightarrow \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.2829 ± 0.0012 ± 0.0056	61k	MENDEZ 08	CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- 2\pi^0$
0.2776 ± 0.0025 ± 0.0043	13.4k	ADAM 05A	CLEO	Repl. by MENDEZ 08

NODE=M071R17

NODE=M071R17

NEW

NODE=M071R17;LINKAGE=ME

NODE=M071R17;LINKAGE=AD

NODE=M071R69

NODE=M071R69

NEW

$\Gamma(J/\psi(1S)\pi^0\pi^0)/\Gamma(J/\psi(1S)\pi^+\pi^-)$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{12}/Γ_{11}
0.527 ± 0.008 OUR FIT [0.528 ± 0.008 OUR 2012 FIT]					NODE=M071R14 NODE=M071R14 NEW
0.513 ± 0.022 OUR AVERAGE				Error includes scale factor of 2.2.	
0.5047 ± 0.0022 ± 0.0102	61k	MENDEZ 08	CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- 2\pi^0$	
0.570 ± 0.009 ± 0.026	14k	1 ABLIKIM 04B	BES	$\psi(2S) \rightarrow J/\psi X$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.4924 ± 0.0047 ± 0.0086	73k	2,3 ADAM 05A	CLEO	Repl. by MENDEZ 08	
0.571 ± 0.018 ± 0.044		4 ANDREOTTI 05	E835	$\psi(2S) \rightarrow J/\psi X$	
0.53 ± 0.06		TANENBAUM 76	MRK1	$e^+ e^-$	
0.64 ± 0.15		5 HILGER 75	SPEC	$e^+ e^-$	

1 From a fit to the J/ψ recoil mass spectra.

2 Not independent from other values reported by ADAM 05A.

3 Using 13,217 $J/\psi\pi^0\pi^0$ and 60,010 $J/\psi\pi^+\pi^-$ events.

4 Not independent from other values reported by ANDREOTTI 05.

5 Ignoring the $J/\psi(1S)\eta$ and $J/\psi(1S)\gamma\gamma$ decays.

$\Gamma(J/\psi(1S)\eta)/\Gamma_{\text{total}}$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{13}/Γ
33.3 ± 0.5 OUR FIT [0.0328 ± 0.0007 OUR 2012 FIT]					NODE=M071R15 NODE=M071R15 NEW
32.9 ± 1.7 OUR AVERAGE				Error includes scale factor of 2.1. See the ideogram below. [0.0296 ± 0.0031 OUR 2012 AVERAGE Scale factor = 1.8]	NEW
33.75 ± 0.17 ± 0.86	68.2k	ABLIKIM 12M	BES3	$e^+ e^- \rightarrow \ell^+ \ell^- 2\gamma$	
29.8 ± 0.9 ± 2.3	5.7k	BAI 04I	BES2	$\psi(2S) \rightarrow J/\psi\gamma\gamma$	
25.5 ± 2.9	386	1 OREGLIA 80	CBAL	$e^+ e^- \rightarrow J/\psi 2\gamma$	
45 ± 12	17	2 BRANDELIK 79B	DASP	$e^+ e^- \rightarrow J/\psi 2\gamma$	
42 ± 6	164	2 BARTEL 78B	CNTR	$e^+ e^-$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
34.3 ± 0.4 ± 0.9	18.4k	3 MENDEZ 08	CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- \eta$	
32.5 ± 0.6 ± 1.1	2.8k	4 ADAM 05A	CLEO	Repl. by MENDEZ 08	
43 ± 8	44	TANENBAUM 76	MRK1	$e^+ e^-$	

1 Recalculated by us using $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$.

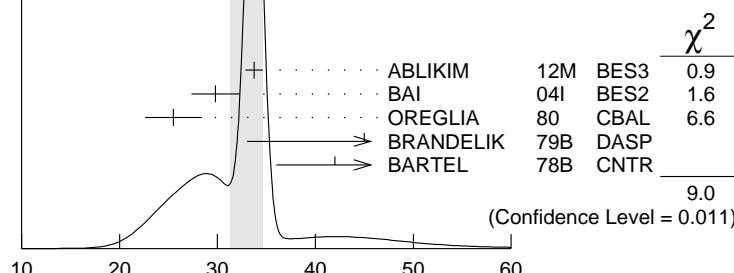
2 Recalculated by us using $B(J/\psi(1S) \rightarrow \mu^+ \mu^-) = 0.0588 \pm 0.0010$.

3 Not independent from other measurements of MENDEZ 08.

4 Not independent from other values reported by ADAM 05A.

WEIGHTED AVERAGE
32.9±1.7 (Error scaled by 2.1)

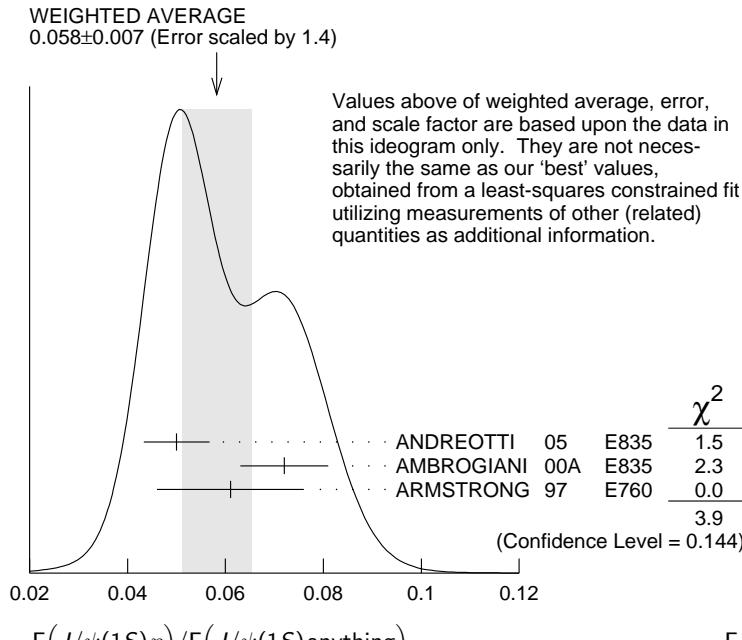
Values above of weighted average, error, and scale factor are based upon the data in this ideogram only. They are not necessarily the same as our 'best' values, obtained from a least-squares constrained fit utilizing measurements of other (related) quantities as additional information.



$\Gamma(J/\psi(1S)\eta)/\Gamma_{\text{total}}$ (units 10^{-3})

$\Gamma(J/\psi(1S)\eta)/\Gamma(J/\psi(1S)\text{anything})$ Γ_{13}/Γ_9

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.0553 ± 0.0008 OUR FIT [0.0551 ± 0.0009 OUR 2012 FIT]				
0.058 ± 0.007 OUR AVERAGE				Error includes scale factor of 1.4. See the ideogram below.
0.050 ± 0.006 ± 0.003	298 ± 20	ANDREOTTI 05 E835	$\psi(2S) \rightarrow J/\psi X$	
0.072 ± 0.009		AMBROGIANI 00A E835	$p\bar{p} \rightarrow \psi(2S)$	
0.061 ± 0.015		ARMSTRONG 97 E760	$\bar{p}p \rightarrow \psi(2S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0549 ± 0.0006 ± 0.0009	18.4k	¹ MENDEZ 08 CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- \eta$	
0.0546 ± 0.0010 ± 0.0007	2.8k	ADAM 05A CLEO	Repl. by MENDEZ 08	

¹ Not independent from other measurements of MENDEZ 08. $\Gamma(J/\psi(1S)\eta)/\Gamma(J/\psi(1S)\text{anything})$ Γ_{13}/Γ_9 $\Gamma(J/\psi(1S)\eta)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{13}/Γ_{11}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.0979 ± 0.0014 OUR FIT [0.0976 ± 0.0016 OUR 2012 FIT]				
0.0979 ± 0.0018 OUR AVERAGE				
0.0979 ± 0.0010 ± 0.0015	18.4k	MENDEZ 08 CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- \eta$	
0.098 ± 0.005 ± 0.010	2k	¹ ABLIKIM 04B BES	$\psi(2S) \rightarrow J/\psi X$	
0.091 ± 0.021		2 HIMEL 80 MRK2	$e^+ e^- \rightarrow \psi(2S) X$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0968 ± 0.0019 ± 0.0013	2.8k	³ ADAM 05A CLEO	Repl. by MENDEZ 08	
0.095 ± 0.007 ± 0.007		⁴ ANDREOTTI 05 E835	$\psi(2S) \rightarrow J/\psi X$	

1 From a fit to the J/ψ recoil mass spectra.2 The value for $B(\psi(2S) \rightarrow J/\psi(1S)\eta)$ reported in HIMEL 80 is derived using $B(\psi(2S)) \rightarrow J/\psi(1S)\pi^+\pi^- = (33 \pm 3)\%$ and $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.138 \pm 0.018$. Calculated by us using $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = (0.1181 \pm 0.0020)$.

3 Not independent from other values reported by ADAM 05A.

4 Not independent from other values reported by ANDREOTTI 05.

NODE=M071R71

NODE=M071R71

NEW

 $\Gamma(J/\psi(1S)\pi^0)/\Gamma_{\text{total}}$ Γ_{14}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
12.68 ± 0.32 OUR AVERAGE				
$[(13.0 \pm 1.0) \times 10^{-4}$ OUR 2012 AVERAGE Scale factor = 1.4]				
12.6 ± 0.2 ± 0.3	4.1k	ABLIKIM 12M BES3	$e^+ e^- \rightarrow \ell^+ \ell^- 2\gamma$	
13.3 ± 0.8 ± 0.3	530	MENDEZ 08 CLEO	$\psi(2S) \rightarrow \ell^+ \ell^- 2\gamma$	
14.3 ± 1.4 ± 1.2	280	BAI 04I BES2	$\psi(2S) \rightarrow J/\psi \gamma\gamma$	
14 ± 6	7	HIMEL 80 MRK2	$e^+ e^-$	
9 ± 2 ± 1	23	¹ OREGLIA 80 CBAL	$\psi(2S) \rightarrow J/\psi 2\gamma$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
13 ± 1 ± 1	88	ADAM 05A CLEO	Repl. by MENDEZ 08	

1 Recalculated by us using $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$.

NODE=M071R71;LINKAGE=AB

NODE=M071R;LINKAGE=8H

NODE=M071R71;LINKAGE=AD

NODE=M071R71;LINKAGE=AN

NODE=M071R16

NODE=M071R16

NEW

NODE=M071R16;LINKAGE=3Q

$\Gamma(J/\psi(1S)\pi^0)/\Gamma(J/\psi(1S)\text{anything})$

$$\Gamma_{14}/\Gamma_9 = \Gamma_{14}/(\Gamma_{11} + \Gamma_{12} + \Gamma_{13} + 0.348\Gamma_{119} + 0.198\Gamma_{120})$$

<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.213 $\pm 0.012 \pm 0.003$	527	1 MENDEZ	08 CLEO	$e^+ e^- \rightarrow J/\psi\gamma\gamma$
0.22 $\pm 0.02 \pm 0.01$		2 ADAM	05A CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow J/\psi\gamma\gamma$

¹ Not independent from other values reported by MENDEZ 08. Supersedes ADAM 05A.² Not independent from other values reported by ADAM 05A. $\Gamma(J/\psi(1S)\pi^0)/\Gamma(J/\psi(1S)\pi^+\pi^-)$

$$\Gamma_{14}/\Gamma_{11}$$

<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.380 $\pm 0.022 \pm 0.005$	527	1 MENDEZ	08 CLEO	$e^+ e^- \rightarrow J/\psi\gamma\gamma$
0.39 $\pm 0.04 \pm 0.01$		2 ADAM	05A CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow J/\psi\gamma\gamma$

¹ Not independent from other values reported by MENDEZ 08. Supersedes ADAM 05A.² Not independent from other values reported by ADAM 05A.**HADRONIC DECAYS** $\Gamma(\pi^0 h_c(1P))/\Gamma_{\text{total}}$

$$\Gamma_{15}/\Gamma$$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
8.6 ± 1.3 OUR AVERAGE				
9.0 $\pm 1.5 \pm 1.3$	3k	1 GE	11 CLEO	$\gamma(2S) \rightarrow \pi^0 \text{ anything}$
8.4 $\pm 1.3 \pm 1.0$	11k	ABLIKIM	10B BES3	$\psi(2S) \rightarrow \pi^0 h_c$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	92^{+23}_{-22}	ADAMS	09 CLEO	$\psi(2S) \rightarrow 2\pi^+ 2\pi^- 2\pi^0$
seen	1282	DOBBS	08A CLEO	$\psi(2S) \rightarrow \pi^0 \eta_c \gamma$
seen	168 ± 40	ROSNER	05 CLEO	$\psi(2S) \rightarrow \pi^0 \eta_c \gamma$

¹ Assuming a width $\Gamma(h_c(1P)) = 0.86$ MeV $\equiv \Gamma_0$, a measured dependence of the central value of $B = (7.6 + 1.4 \times \Gamma(h_c(1P)/\Gamma_0) \times 10^{-4}$, and with a systematic error that accounts for the width variation range 0.43–1.29 MeV. $\Gamma(3(\pi^+\pi^-)\pi^0)/\Gamma_{\text{total}}$

$$\Gamma_{16}/\Gamma$$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
35 ± 16	6	FRANKLIN	83 MRK2	$e^+ e^- \rightarrow \text{hadrons}$

 $\Gamma(2(\pi^+\pi^-)\pi^0)/\Gamma_{\text{total}}$

$$\Gamma_{17}/\Gamma$$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
29 ± 10 OUR AVERAGE				
Error includes scale factor of 4.6. See the ideogram below.				
24.9 $\pm 0.7 \pm 3.6$	2173	ABLIKIM	07D BES2	$e^+ e^- \rightarrow \psi(2S)$
125 $\pm 12 \pm 2$	410	¹ AUBERT	07AU BABR	$10.6 e^+ e^- \rightarrow 2(\pi^+\pi^-)\pi^0 \gamma$
26.1 $\pm 0.7 \pm 3.0$	1703	BRIERE	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$

^{30 ± 8} ^{42 FRANKLIN 83 MRK2 $e^+ e^-$} ¹ AUBERT 07AU reports $[\Gamma(\psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0)/\Gamma_{\text{total}}] \times [\Gamma(\psi(2S) \rightarrow e^+ e^-)] = (297 \pm 22 \pm 18) \times 10^{-4}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+ e^-) = 2.37 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M071S25

NODE=M071S25

NODE=M071S25;LINKAGE=ME
NODE=M071S25;LINKAGE=ADNODE=M071S26
NODE=M071S26NODE=M071S26;LINKAGE=ME
NODE=M071S26;LINKAGE=AD

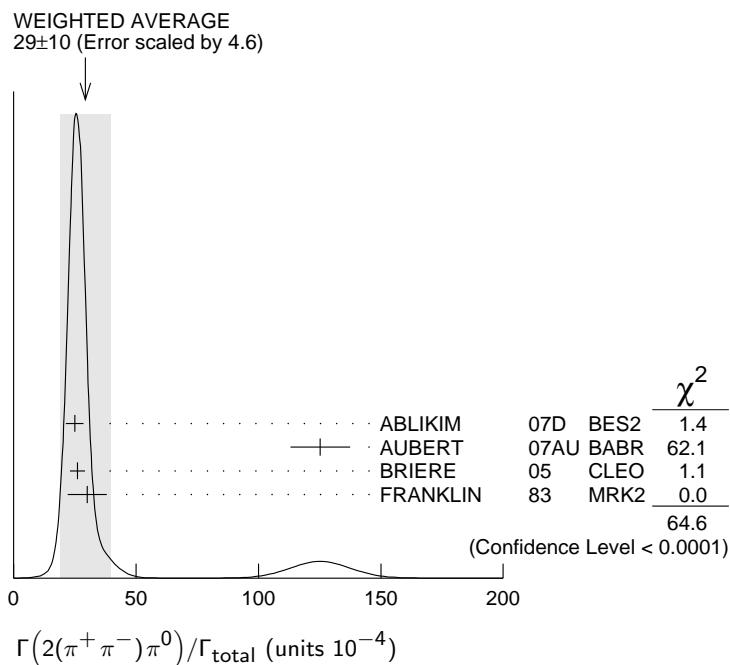
NODE=M071310

NODE=M071S42
NODE=M071S42

NODE=M071S42;LINKAGE=GE

NODE=M071R37
NODE=M071R37NODE=M071R22
NODE=M071R22

NODE=M071R22;LINKAGE=UB

 **$\Gamma(p_2(1320))/\Gamma_{\text{total}}$**

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$2.55 \pm 0.73 \pm 0.47$		112 ± 31	BAI	04C BES2	$\psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<2.3		90	BAI	98J BES	e^+e^-

 Γ_{18}/Γ

NODE=M071R65
NODE=M071R65

 $\Gamma(p\bar{p})/\Gamma_{\text{total}}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.75 ± 0.12 OUR FIT				
[(2.76 ± 0.12) $\times 10^{-4}$ OUR 2012 FIT]				
2.95 ± 0.23 OUR AVERAGE				Error includes scale factor of 1.5. See the ideogram below.
3.36 ± 0.09 ± 0.25	1618	ABLIKIM	07C BES	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$
2.87 ± 0.12 ± 0.15	557	PEDLAR	05 CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$
1.4 ± 0.8	4	BRANDELIK	79C DASP	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$
2.3 ± 0.7		FELDMAN	77 MRK1	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$

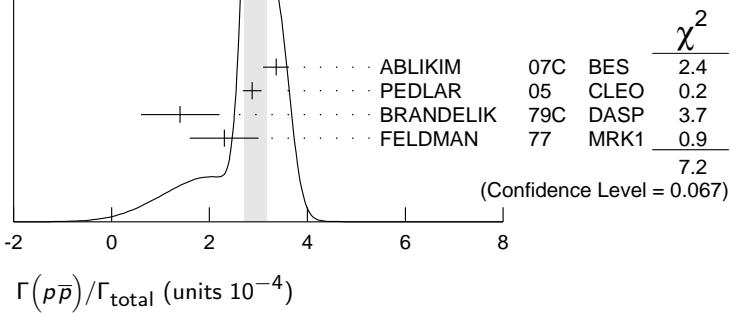
 Γ_{19}/Γ

NODE=M071R25
NODE=M071R25

NEW

WEIGHTED AVERAGE
2.95±0.23 (Error scaled by 1.5)

Values above of weighted average, error, and scale factor are based upon the data in this ideogram only. They are not necessarily the same as our 'best' values, obtained from a least-squares constrained fit utilizing measurements of other (related) quantities as additional information.



$\Gamma(p\bar{p})/\Gamma(J/\psi(1S)\pi^+\pi^-)$ VALUE (units 10^{-4})**8.09±0.35 OUR FIT**[(8.2 ± 0.4) $\times 10^{-4}$ OUR 2012 FIT]**6.98±0.49±0.97**

DOCUMENT ID

TECN

COMMENT

 Γ_{19}/Γ_{11}

NODE=M071S40

NODE=M071S40

NEW

 $\Gamma(\Delta^{++}\bar{\Delta}^{--})/\Gamma_{\text{total}}$ VALUE (units 10^{-5})**12.8±1.0±3.4**

EVTS

DOCUMENT ID

TECN

COMMENT

 Γ_{20}/Γ

NODE=M071R50

NODE=M071R50

¹ Estimated using $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.310 \pm 0.028$. $\Gamma(\Lambda\bar{\Lambda}\pi^0)/\Gamma_{\text{total}}$ VALUE (units 10^{-5})**< 0.29 (CL = 90%)**[$< 1.2 \times 10^{-4}$ (CL = 90%) OUR 2012 BEST LIMIT]**< 0.29**

90

EVTS

DOCUMENT ID

TECN

COMMENT

 Γ_{21}/Γ

NODE=M071R6

NODE=M071R6

• • • We do not use the following data for averages, fits, limits, etc. • • •

<12

EVTS

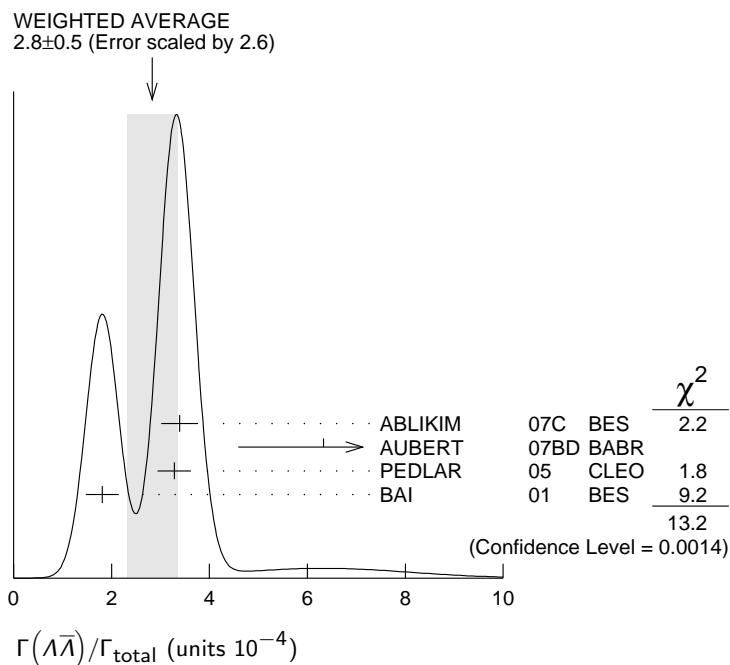
DOCUMENT ID

TECN

COMMENT

<12

EVTS



$\Gamma(\Sigma^0 \bar{p} K^+ + \text{c.c.})/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.67 \pm 0.13 \pm 0.12$	276	1 ABLIKIM	13D BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{p} K^+$

¹ Using $B(\Lambda \rightarrow p \pi^-) = 63.9\%$, and $B(\Sigma^0 \rightarrow \Lambda \gamma) = 100\%$.

Γ_{27}/Γ

NODE=M071S63
NODE=M071S63

$\Gamma(\Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$25.7 \pm 4.4 \pm 6.8$	35	PEDLAR	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

Γ_{28}/Γ

NODE=M071R47
NODE=M071R47

$\Gamma(\Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}$

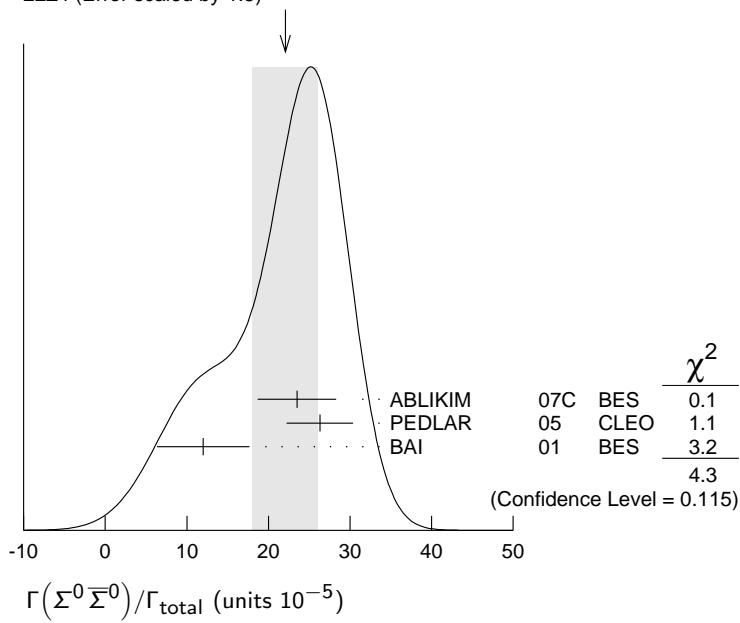
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
22 ± 4 OUR AVERAGE				Error includes scale factor of 1.5. See the ideogram below.
$23.5 \pm 3.6 \pm 3.2$	59	ABLIKIM	07C BES	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
$26.3 \pm 3.5 \pm 2.1$	58	PEDLAR	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
$12 \pm 4 \pm 4$	8	1 BAI	01 BES	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

¹ Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.

Γ_{29}/Γ

NODE=M071R51
NODE=M071R51

WEIGHTED AVERAGE
22±4 (Error scaled by 1.5)



$\Gamma(\Sigma(1385)^+ \bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
11±3±3	14	1 BAI	01 BES	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

1 Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.

 Γ_{30}/Γ

NODE=M071R52
NODE=M071R52

 $\Gamma(\Xi^- \bar{\Xi}^+)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
18 ± 6 OUR AVERAGE					Error includes scale factor of 2.8. See the ideogram below.

30.3±4.0±3.2 67 ABLIKIM 07C BES $e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
 23.8±3.0±2.1 63 PEDLAR 05 CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
 9.4±2.7±1.5 12 1 BAI 01 BES $e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

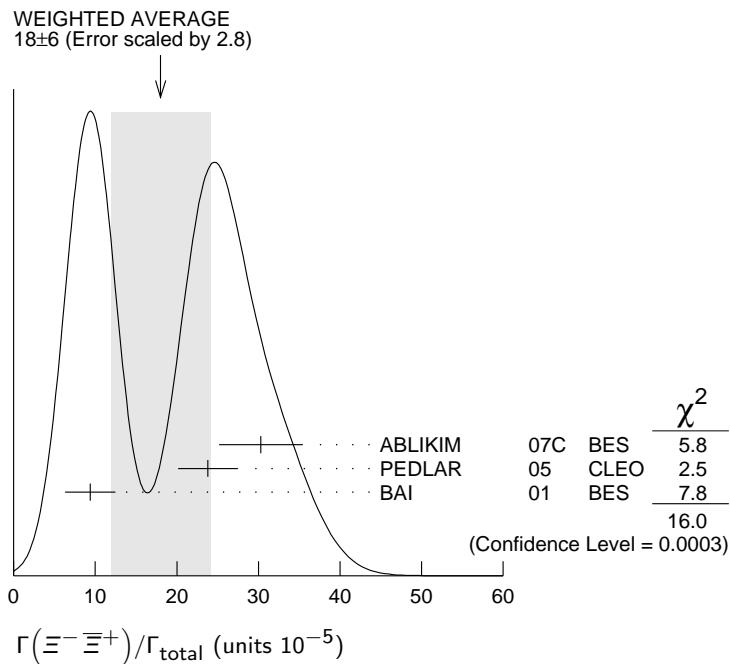
• • • We do not use the following data for averages, fits, limits, etc. • • •

<20 90 FELDMAN 77 MRK1 $e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

1 Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.

 Γ_{31}/Γ

NODE=M071R29
NODE=M071R29

 $\Gamma(\Xi^0 \bar{\Xi}^0)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
27.5±6.4±6.1	19	PEDLAR	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

 Γ_{32}/Γ

NODE=M071R48
NODE=M071R48

 $\Gamma(\Xi(1530)^0 \bar{\Xi}(1530)^0)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
< 8.1	90	1 BAI	01 BES	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<32 90 PEDLAR 05 CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

1 Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.

 Γ_{33}/Γ

NODE=M071R53
NODE=M071R53

 $\Gamma(\Omega^- \bar{\Omega}^+)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
< 7.3	90	1 BAI	01 BES	$e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<16 90 PEDLAR 05 CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

1 Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.

 Γ_{34}/Γ

NODE=M071R54
NODE=M071R54

NODE=M071R54;LINKAGE=PP

$\Gamma(\pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-4})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{35}/Γ
1.53±0.07 OUR AVERAGE					
$[(1.50 \pm 0.08) \times 10^{-4}$ OUR 2012 AVERAGE Scale factor = 1.1]					
1.65±0.03±0.15	4.5k	ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	
1.54±0.06±0.06	948	ALEXANDER	10 CLEO	$\psi(2S) \rightarrow \pi^0 p\bar{p}$	
1.32±0.10±0.15	256 ± 18	¹ ABLIKIM	05E BES2	$e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}\gamma\gamma$	
1.4 ± 0.5	9	FRANKLIN	83 MRK2	$e^+ e^-$	

¹ Computed using $B(\pi^0 \rightarrow \gamma\gamma) = (98.80 \pm 0.03)\%$.

 $\Gamma(N(940)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{36}/Γ
6.42±0.20^{+1.78}_{-1.28}	1.9k	¹ ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

 $\Gamma(N(1440)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{37}/Γ
7.3^{+1.7}_{-1.5} OUR AVERAGE	Error includes scale factor of 2.5. $[(8.1 \pm 0.8) \times 10^{-5}$ OUR 2012 AVERAGE]				

3.58±0.25^{+1.59}_{-0.84}

1.1k ¹ ABLIKIM 13A BES3 $\psi(2S) \rightarrow p\bar{p}\pi^0$

8.1 ± 0.7 ± 0.3 474 ² ALEXANDER 10 CLEO $\psi(2S) \rightarrow \pi^0 p\bar{p}$

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

² From a fit of the $p\bar{p}$ and $p\pi^0$ mass distributions to a combination of $N(1440)\bar{p}$, $\pi^0 f_0(2100)$, and two other broad, unestablished resonances.

 $\Gamma(N(1520)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{38}/Γ
0.64±0.05^{+0.22}_{-0.17}	0.2k	¹ ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

 $\Gamma(N(1535)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{39}/Γ
2.47±0.28^{+0.99}_{-0.97}	0.7k	¹ ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

 $\Gamma(N(1650)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{40}/Γ
3.76±0.28^{+1.37}_{-1.66}	1.1k	¹ ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

 $\Gamma(N(1720)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{41}/Γ
1.79±0.10^{+0.24}_{-0.71}	0.5k	¹ ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

 $\Gamma(N(2300)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{42}/Γ
2.62±0.28^{+1.12}_{-0.64}	0.9k	¹ ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

 $\Gamma(N(2570)\bar{p} + \text{c.c.} \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$

<u>VALUE</u> (units 10^{-5})	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_{43}/Γ
2.13±0.08^{+0.40}_{-0.30}	0.8k	¹ ABLIKIM	13A BES3	$\psi(2S) \rightarrow p\bar{p}\pi^0$	

¹ From a fit of $\pi^0 p\bar{p}$ data to eight distinct intermediate $N\bar{p}$ resonant states.

 Γ_{35}/Γ

NODE=M071R35

NODE=M071R35

NEW

NODE=M071R35;LINKAGE=AB

NODE=M071S56

NODE=M071S56

NODE=M071S56;LINKAGE=AB

NODE=M071S50

NODE=M071S50

NEW

NODE=M071S57

NODE=M071S57

NODE=M071S58

NODE=M071S58

NODE=M071S58;LINKAGE=AB

NODE=M071S59

NODE=M071S59

NODE=M071S60

NODE=M071S60

NODE=M071S60;LINKAGE=AB

NODE=M071S61

NODE=M071S61

NODE=M071S62

NODE=M071S62

NODE=M071S62;LINKAGE=AB

$\Gamma(\pi^0 f_0(2100) \rightarrow \pi^0 p\bar{p})/\Gamma_{\text{total}}$	Γ_{44}/Γ				
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT	
1.1±0.4±0.1	76	1 ALEXANDER	10 CLEO	$\psi(2S) \rightarrow \pi^0 p\bar{p}$	

¹ From a fit of the $p\bar{p}$ and $p\pi^0$ mass distributions to a combination of $N_1^*(1440)\bar{p}$, $\pi^0 f_0(2100)$, and two other broad, unestablished resonances.

$\Gamma(\eta p\bar{p})/\Gamma_{\text{total}}$	Γ_{45}/Γ				
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT	
5.7±0.6 OUR AVERAGE					
5.6±0.6±0.3	154	ALEXANDER	10 CLEO	$\psi(2S) \rightarrow \eta p\bar{p}$	
5.8±1.1±0.7	44.8 ± 8.5	1 ABLIKIM	05E BES2	$e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}\gamma\gamma$	
8 ± 3 ± 3	9.8	BRIERE	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}\pi^+\pi^-$	

¹ Computed using $B(\eta \rightarrow \gamma\gamma) = (39.43 \pm 0.26)\%$.

$\Gamma(\eta f_0(2100) \rightarrow \eta p\bar{p})/\Gamma_{\text{total}}$	Γ_{46}/Γ				
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT	
1.2±0.4±0.1	31	1 ALEXANDER	10 CLEO	$\psi(2S) \rightarrow \eta p\bar{p}$	

¹ From a fit of the $p\bar{p}$ and $p\eta$ distributions to a combination of $N^*(1535)\bar{p}$ and $\eta f_0(2100)$.

$\Gamma(N(1535)\bar{p} \rightarrow \eta p\bar{p})/\Gamma_{\text{total}}$	Γ_{47}/Γ				
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT	
4.4±0.6±0.3	123	1 ALEXANDER	10 CLEO	$\psi(2S) \rightarrow \eta p\bar{p}$	

¹ From a fit of the $p\bar{p}$ and $p\eta$ distributions to a combination of $N^*(1535)\bar{p}$ and $\eta f_0(2100)$.

$\Gamma(\omega p\bar{p})/\Gamma_{\text{total}}$	Γ_{48}/Γ				
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
0.69±0.21 OUR AVERAGE					
0.6 ± 0.2 ± 0.2	21.2	BRIERE	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}\pi^+\pi^-\pi^0$	
0.8 ± 0.3 ± 0.1	14.9 ± 0.1	1 BAI	03B BES	$\psi(2S) \rightarrow p\bar{p}\pi^+\pi^-\pi^0$	

¹ Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(\phi p\bar{p})/\Gamma_{\text{total}}$	Γ_{49}/Γ				
VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT	
<0.24	90	BRIERE	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}K^+K^-$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.26	90	1 BAI	03B BES	$\psi(2S) \rightarrow K^+K^-\bar{p}\bar{p}$
-------	----	-------	---------	---

¹ Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(\pi^+\pi^- p\bar{p})/\Gamma_{\text{total}}$	Γ_{50}/Γ				
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
6.0±0.4 OUR AVERAGE					
5.9±0.2±0.4	904.5	BRIERE	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}\pi^+\pi^-$	
8 ± 2		1 TANENBAUM	78 MRK1	$e^+ e^- \rightarrow$	

¹ Assuming entirely strong decay.

$\Gamma(p\bar{n}\pi^- \text{ or c.c.})/\Gamma_{\text{total}}$	Γ_{51}/Γ				
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
2.48±0.17 OUR AVERAGE					
2.45±0.11±0.21	851	ABLIKIM	06I BES2	$e^+ e^- \rightarrow p\pi^- X$	
2.52±0.12±0.22	849	ABLIKIM	06I BES2	$e^+ e^- \rightarrow \bar{p}\pi^+ X$	

$\Gamma(p\bar{n}\pi^- \pi^0)/\Gamma_{\text{total}}$	Γ_{52}/Γ				
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
3.18±0.50±0.50	135 ± 21	ABLIKIM	06I BES2	$e^+ e^- \rightarrow p\pi^-\pi^0 X$	

$\Gamma(\eta\pi^+\pi^-)/\Gamma_{\text{total}}$	Γ_{54}/Γ				
VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT	
<1.6	90	BRIERE	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$	

NODE=M071S51
NODE=M071S51

NODE=M071S51;LINKAGE=AL

NODE=M071R56
NODE=M071R56

NODE=M071R56;LINKAGE=AB

NODE=M071S52
NODE=M071S52

NODE=M071S52;LINKAGE=AL

NODE=M071S53
NODE=M071S53

NODE=M071S53;LINKAGE=AL

NODE=M071R79
NODE=M071R79

NODE=M071R;LINKAGE=B3

NODE=M071R82
NODE=M071R82

NODE=M071R31
NODE=M071R31

NODE=M071R02
NODE=M071R02

NODE=M071S06
NODE=M071S06

$\Gamma(\eta\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$					Γ_{55}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
9.5±0.7±1.5		¹ BRIERE	05	CLEO $e^+e^- \rightarrow \psi(2S) \rightarrow$ hadr	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
10.3±0.8±1.4	201.7	² BRIERE	05	CLEO $e^+e^- \rightarrow \psi(2S) \rightarrow$ $\eta 3\pi (\eta \rightarrow \gamma\gamma)$	OCCUR=2
8.1±1.4±1.6	50.0	² BRIERE	05	CLEO $e^+e^- \rightarrow \psi(2S) \rightarrow$ $\eta 3\pi (\eta \rightarrow 3\pi)$	OCCUR=3

¹ Average of $\eta \rightarrow \gamma\gamma$ and $\eta \rightarrow 3\pi$.

² Not independent from other values reported by BRIERE 05.

$\Gamma(2(\pi^+\pi^-)\eta)/\Gamma_{\text{total}}$					Γ_{56}/Γ
VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT	
1.2±0.6±0.1	16	¹ AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow 2(\pi^+\pi^-)\eta\gamma$	NODE=M071S38 NODE=M071S38

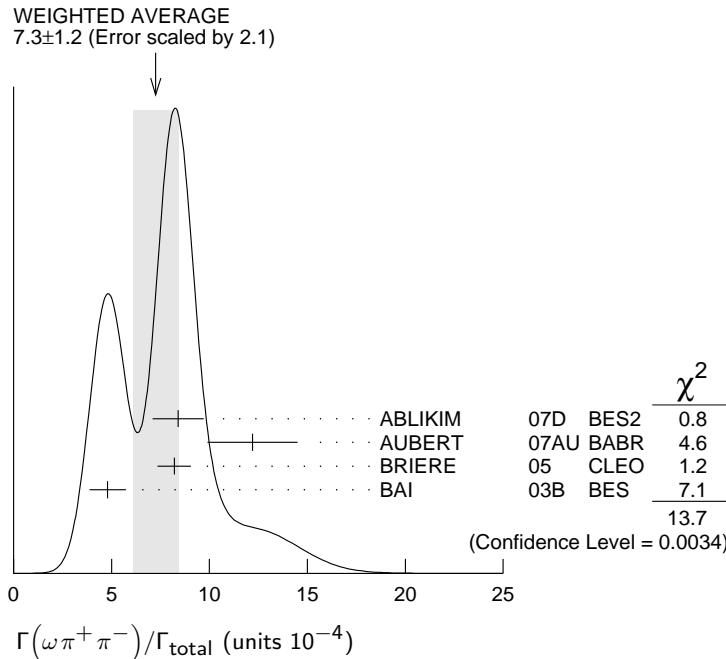
¹ AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot B(\psi(2S) \rightarrow 2(\pi^+\pi^-)\eta) \cdot B(\eta \rightarrow \gamma\gamma) = 1.2 \pm 0.7 \pm 0.1 \text{ eV}$.

$\Gamma(\eta'\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$					Γ_{57}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
4.5±1.6±1.3	12.8	BRIERE	05	CLEO $e^+e^- \rightarrow \psi(2S) \rightarrow$ hadr	NODE=M071S08 NODE=M071S08

$\Gamma(\omega\pi^+\pi^-)/\Gamma_{\text{total}}$					Γ_{58}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
7.3±1.2 OUR AVERAGE		Error includes scale factor of 2.1. See the ideogram below.			
8.4±0.5±1.2	386	ABLIKIM	07D BES2	$e^+e^- \rightarrow \psi(2S)$	
12.2±2.2±0.7	37	¹ AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow \omega\pi^+\pi^-\gamma$	
8.2±0.5±0.7	391	BRIERE	05	CLEO $e^+e^- \rightarrow \psi(2S) \rightarrow$ $2(\pi^+\pi^-)\pi^0$	
4.8±0.6±0.7	100 ± 22	² BAI	03B BES	$\psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$	

¹ AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot B(\psi(2S) \rightarrow \omega\pi^+\pi^-) \cdot B(\omega \rightarrow 3\pi) = 2.69 \pm 0.73 \pm 0.16 \text{ eV}$.

² Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.



$\Gamma(b_1^\pm\pi^\mp)/\Gamma_{\text{total}}$					Γ_{59}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
4.0 ±0.6 OUR AVERAGE		Error includes scale factor of 1.1.			
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5.1 ± 0.6 ± 0.8	202	ABLIKIM	07D BES2	$e^+e^- \rightarrow \psi(2S)$	
$4.18^{+0.43}_{-0.42} \pm 0.92$	170	ADAM	05	CLEO $e^+e^- \rightarrow \psi(2S)$	
3.2 ± 0.6 ± 0.5	61 ± 11	^{1,2} BAI	03B BES	$\psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$	
5.2 ± 0.8 ± 1.0		¹ BAI	99C BES	Repl. by BAI 03B	

NODE=M071S07
NODE=M071S07

OCCUR=2

OCCUR=3

NODE=M071S07;LINKAGE=BR
NODE=M071S07;LINKAGE=BI

NODE=M071S38
NODE=M071S38

NODE=M071S38;LINKAGE=UB

NODE=M071S08
NODE=M071S08

NODE=M071R77
NODE=M071R77

NODE=M071R77;LINKAGE=UB

NODE=M071R77;LINKAGE=B3

NODE=M071R40
NODE=M071R40

¹ Assuming $B(b_1 \rightarrow \omega\pi) = 1$.

² Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(b_1^0\pi^0)/\Gamma_{\text{total}}$					Γ_{60}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$2.35^{+0.47}_{-0.42} \pm 0.40$	45	ADAM	05	CLEO $e^+e^- \rightarrow \psi(2S)$	

$\Gamma(\omega f_2(1270))/\Gamma_{\text{total}}$					Γ_{61}/Γ
<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2.2 ± 0.4 OUR AVERAGE					
$2.3 \pm 0.5 \pm 0.4$		57	ABLIKIM	07D BES2	$e^+e^- \rightarrow \psi(2S)$
$2.05 \pm 0.41 \pm 0.38$		62 ± 12	BAI	04C BES2	$\psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.5		90	¹ BAI	03B BES	$\psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$
<1.7		90	BAI	98J BES	Repl. by BAI 03B

¹ Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(\pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}$					Γ_{62}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
7.5 ± 0.9 OUR AVERAGE				Error includes scale factor of 1.9. [(7.5 ± 0.9) $\times 10^{-4}$ OUR 2012 AVERAGE Scale factor = 1.9]	
$10.8 \pm 1.9 \pm 0.2$	85	¹ AUBERT	07AK BABR	$10.6 e^+e^- \rightarrow \pi^+\pi^-K^+K^-\gamma$	
$7.1 \pm 0.3 \pm 0.4$	817.2	BRIERE	05	CLEO $e^+e^- \rightarrow \psi(2S) \rightarrow K^+K^-\pi^+\pi^-$	
16 ± 4		² TANENBAUM	78	MRK1 e^+e^-	
1 AUBERT 07AK reports $[\Gamma(\psi(2S) \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}] \times [\Gamma(\psi(2S) \rightarrow e^+e^-)] = (2.56 \pm 0.42 \pm 0.16) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+e^-) = 2.37 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.					
2 Assuming entirely strong decay.					
$2.2 \pm 0.2 \pm 0.4$	223.8	BRIERE	05	CLEO $e^+e^- \rightarrow \psi(2S) \rightarrow K^+K^-\pi^+\pi^-$	

$\Gamma(K^*(892)^0\bar{K}_2^*(1430)^0)/\Gamma_{\text{total}}$					Γ_{64}/Γ
<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$1.86 \pm 0.32 \pm 0.43$		93 ± 16	BAI	04C	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.2		90	BAI	98J BES	e^+e^-

$\Gamma(K^+K^-\pi^+\pi^-\eta)/\Gamma_{\text{total}}$					Γ_{65}/Γ
<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$1.3 \pm 0.7 \pm 0.1$	7	¹ AUBERT	07AU BABR	$10.6 e^+e^- \rightarrow K^+K^-\pi^+\pi^-\eta\gamma$	
1 AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot B(\psi(2S) \rightarrow 2(\pi^+\pi^-\eta)) \cdot B(\eta \rightarrow \gamma\gamma) = 1.2 \pm 0.7 \pm 0.1$ eV.					

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$					Γ_{66}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$10.0 \pm 2.5 \pm 1.8$	65	ABLIKIM	07D BES2	$e^+e^- \rightarrow \psi(2S)$	

$\Gamma(K_1(1270)^{\pm}K^{\mp})/\Gamma_{\text{total}}$					Γ_{68}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$10.0 \pm 1.8 \pm 2.1$		¹ BAI	99C BES	e^+e^-	

¹ Assuming $B(K_1(1270) \rightarrow K\rho) = 0.42 \pm 0.06$

$\Gamma(K_S^0K_S^0\pi^+\pi^-)/\Gamma_{\text{total}}$					Γ_{69}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$2.20 \pm 0.25 \pm 0.37$	83 ± 9	ABLIKIM	050 BES2	$e^+e^- \rightarrow \psi(2S)$	

NODE=M071R;LINKAGE=M1

NODE=M071R40;LINKAGE=B3

NODE=M071R21

NODE=M071R21

NODE=M071R64

NODE=M071R64

NODE=M071R64;LINKAGE=B3

NODE=M071R24

NODE=M071R24

NEW

NODE=M071R24;LINKAGE=BE

NODE=M071R24;LINKAGE=K

NODE=M071S09

NODE=M071S09

NODE=M071R66

NODE=M071R66

NODE=M071S39

NODE=M071S39

NODE=M071R09

NODE=M071R09

NODE=M071R41

NODE=M071R41

NODE=M071R;LINKAGE=M2

NODE=M071R49

NODE=M071R49

$\Gamma(\rho^0 p\bar{p})/\Gamma_{\text{total}}$					Γ_{70}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
0.5±0.1±0.2	61.1	BRIERE	05	CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}\pi^+\pi^-$	

NODE=M071S14
NODE=M071S14

$\Gamma(K^+\bar{K}^*(892)^0\pi^- + \text{c.c.})/\Gamma_{\text{total}}$					Γ_{71}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
6.7±2.5		TANENBAUM 78	MRK1	$e^+ e^-$	

NODE=M071R34
NODE=M071R34

$\Gamma(2(\pi^+\pi^-))/\Gamma_{\text{total}}$					Γ_{72}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
2.4±0.6 OUR AVERAGE				Error includes scale factor of 2.2.	
2.2±0.2±0.2	308	BRIERE	05	CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow 2(\pi^+\pi^-)$	
4.5±1.0		TANENBAUM 78	MRK1	$e^+ e^-$	

NODE=M071R27
NODE=M071R27

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{\text{total}}$					Γ_{73}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
2.2±0.6 OUR AVERAGE				Error includes scale factor of 1.4.	
2.0±0.2±0.4	285.5	BRIERE	05	CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow 2(\pi^+\pi^-)$	
4.2±1.5		TANENBAUM 78	MRK1	$e^+ e^-$	

NODE=M071R33
NODE=M071R33

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$					Γ_{74}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
12.6±0.9 OUR AVERAGE					

NODE=M071S10
NODE=M071S10

18.6±5.6±0.3	32	¹ AUBERT	07AU BABR	$10.6 e^+ e^- \rightarrow K^+K^-\pi^+\pi^-\pi^0\gamma$	
11.7±1.0±1.5	597	ABLIKIM	06G BES2	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0$	
12.7±0.5±1.0	711.6	BRIERE	05	CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0$	

¹AUBERT 07AU reports $[\Gamma(\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}] \times [\Gamma(\psi(2S) \rightarrow e^+e^-)] = (44 \pm 13 \pm 3) \times 10^{-4}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+e^-) = 2.37 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M071S10;LINKAGE=UB

$\Gamma(\omega f_0(1710) \rightarrow \omega K^+K^-)/\Gamma_{\text{total}}$					Γ_{75}/Γ
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT	
5.9±2.0±0.9	19	ABLIKIM	06G BES2	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0$	

NODE=M071S20
NODE=M071S20

$\Gamma(K^*(892)^0 K^-\pi^+\pi^0 + \text{c.c.})/\Gamma_{\text{total}}$					Γ_{76}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
8.6±1.3±1.8	238	ABLIKIM	06G BES2	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0$	

NODE=M071S21
NODE=M071S21

$\Gamma(K^*(892)^+ K^-\pi^+\pi^- + \text{c.c.})/\Gamma_{\text{total}}$					Γ_{77}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
9.6±2.2±1.7	133	ABLIKIM	06G BES2	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0$	

NODE=M071S22
NODE=M071S22

$\Gamma(K^*(892)^+ K^-\rho^0 + \text{c.c.})/\Gamma_{\text{total}}$					Γ_{78}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
7.3±2.2±1.4	78	ABLIKIM	06G BES2	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0$	

NODE=M071S23
NODE=M071S23

$\Gamma(K^*(892)^0 K^-\rho^+ + \text{c.c.})/\Gamma_{\text{total}}$					Γ_{79}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
6.1±1.3±1.2	125	ABLIKIM	06G BES2	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-\pi^0$	

NODE=M071S24
NODE=M071S24

$\Gamma(\eta K^+ K^-, \text{no } \eta\phi)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{80}/Γ
3.08±0.29±0.25	0.3k	1	ABLIKIM	12L BES3	$\psi(2S) \rightarrow K^+ K^- \gamma\gamma$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<13	90	BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$	

¹ Excluding $\eta\phi$. $\Gamma(\omega K^+ K^-)/\Gamma_{\text{total}}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{81}/Γ
1.85±0.25 OUR AVERAGE				Error includes scale factor of 1.1.	
2.38±0.37±0.29	78	ABLIKIM	06G BES2	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$	
1.9 ± 0.3 ± 0.3	76.8	BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
1.5 ± 0.3 ± 0.2	23.0 ± 5.2	1 BAI	03B BES	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$	

¹ Normalized to $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.305 \pm 0.016$. $\Gamma(3(\pi^+ \pi^-))/\Gamma_{\text{total}}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{82}/Γ
3.5 ± 2.0 OUR AVERAGE				Error includes scale factor of 2.8.	
5.45±0.42±0.87	671	ABLIKIM	05H BES2	$e^+ e^- \rightarrow \psi(2S) \rightarrow 3(\pi^+ \pi^-)$	

¹ TANENBAUM 78 MRK1 $e^+ e^-$ ¹ Assuming entirely strong decay. $\Gamma(p\bar{p}\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{83}/Γ
7.3±0.4±0.6	434.9	BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}\pi^+\pi^-\pi^0$

 $\Gamma(K^+ K^-)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{84}/Γ
7.1 ± 0.5 OUR AVERAGE					Error includes scale factor of 1.5. [(6.3 ± 0.7) × 10 ⁻⁵ OUR 2012 AVERAGE]	

7.48±0.23±0.39	1.3k	1 METREVELI	12	$\psi(2S) \rightarrow K^+ K^-$	
6.3 ± 0.6 ± 0.3		DOBBS	06A	CLEO	$e^+ e^-$
10 ± 7		BRANDELIK	79C	DASP	$e^+ e^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 5 90 FELDMAN 77 MRK1 $e^+ e^-$					

¹ Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration. $\Gamma(K_S^0 K_L^0)/\Gamma_{\text{total}}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{85}/Γ
5.34±0.33 OUR AVERAGE					
[(5.4 ± 0.5) × 10 ⁻⁵ OUR 2012 AVERAGE]					
[Using $B(K_S^0 \rightarrow \pi^+ \pi^-) = 0.6860 \pm 0.0027$]					
5.28±0.25±0.34	478 ± 23	1 METREVELI	12	$\psi(2S) \rightarrow K_S^0 K_L^0$	
5.8 ± 0.8 ± 0.4		DOBBS	06A	CLEO	$e^+ e^-$
5.24±0.47±0.48	156 ± 14	2 BAI	04B BES2	$\psi(2S) \rightarrow K_S^0 K_L^0 \rightarrow \pi^+ \pi^- X$	

¹ Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.² Using $B(K_S^0 \rightarrow \pi^+ \pi^-) = 0.6860 \pm 0.0027$. $\Gamma(\pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{86}/Γ
2.01±0.17 OUR AVERAGE				Error includes scale factor of 1.7. See the ideogram below.	
[(1.68 ± 0.26) × 10 ⁻⁴ OUR 2012 AVERAGE Scale factor = 1.4]					
[Using $B(K_S^0 \rightarrow \pi^+ \pi^-) = 0.6860 \pm 0.0027$]					
2.14±0.03 ^{+0.12} _{-0.11}	7k	1 ABLIKIM	12H BES3	$e^+ e^- \rightarrow \psi(2S)$	
1.81±0.18±0.19	260 ± 19	2 ABLIKIM	05J BES2	$e^+ e^- \rightarrow \psi(2S)$	
1.88 ^{+0.16} _{-0.15} ±0.28	194	ADAM	05	CLEO	$e^+ e^- \rightarrow \psi(2S)$
0.85±0.46	4	FRANKLIN	83	MRK2	$e^+ e^- \rightarrow \text{hadrons}$

NODE=M071S11
NODE=M071S11

NODE=M071S11;LINKAGE=AB

NODE=M071R78
NODE=M071R78

NODE=M071R78;LINKAGE=B3

NODE=M071R32
NODE=M071R32NODE=M071R23
NODE=M071R23

NEW

NODE=M071R23;LINKAGE=ME

NODE=M071R87
NODE=M071R87

NEW

NODE=M071R87;LINKAGE=ME

NODE=M071R;LINKAGE=KZ

NODE=M071R36
NODE=M071R36

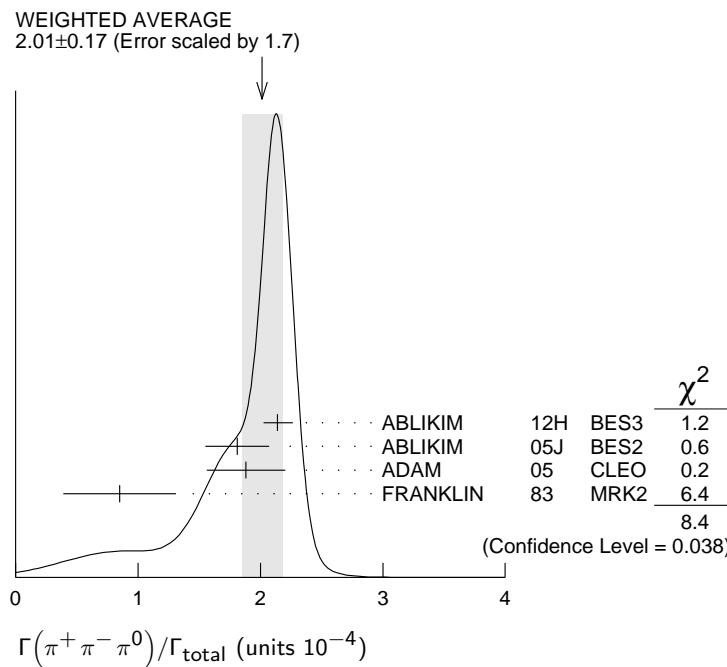
NEW

¹ From $\psi(2S) \rightarrow \pi^+ \pi^- \pi^0$ events directly. The quoted systematic error includes a contribution of 4% (added in quadrature) from the uncertainty on the number of $\psi(2S)$ events.

² From a PW analysis of $\psi(2S) \rightarrow \pi^+ \pi^- \pi^0$.

NODE=M071R36;LINKAGE=AB

NODE=M071R;LINKAGE=AK



$\Gamma(\rho(2150)\pi \rightarrow \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$ Γ_{87}/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT	Γ_{87}/Γ
$1.94 \pm 0.25 \pm 1.15$ -0.34	1 ABLIKIM	05J BES2	$\psi(2S) \rightarrow \rho(2150)\pi \rightarrow \pi^+ \pi^- \pi^0$	

¹ From a PW analysis of $\psi(2S) \rightarrow \pi^+ \pi^- \pi^0$.

NODE=M071R57
NODE=M071R57

$\Gamma(\rho(770)\pi \rightarrow \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$ Γ_{88}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{88}/Γ
0.32 ± 0.12 OUR AVERAGE					Error includes scale factor of 1.8.	

$0.51 \pm 0.07 \pm 0.11$	1	ABLIKIM	05J BES2	$\psi(2S) \rightarrow \rho(770)\pi \rightarrow \pi^+ \pi^- \pi^0$	
$0.24 \pm 0.08 \pm 0.02$	22	ADAM	05 CLEO	$e^+ e^- \rightarrow \psi(2S)$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.83	90	1	FRANKLIN	83 MRK2	$e^+ e^-$
<10	90		BARTEL	76 CNTR	$e^+ e^-$
<10	90	2	ABRAMS	75 MRK1	$e^+ e^-$

¹ From a PW analysis of $\psi(2S) \rightarrow \pi^+ \pi^- \pi^0$.

² Final state $\rho^0 \pi^0$.

NODE=M071R57;LINKAGE=AK

NODE=M071R26
NODE=M071R26

$\Gamma(\pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{89}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{89}/Γ
0.78 ± 0.26 OUR AVERAGE						

$[(8 \pm 5) \times 10^{-5}$ OUR 2012 AVERAGE]

$0.76 \pm 0.25 \pm 0.06$	30	1 METREVELI	12	$\psi(2S) \rightarrow \pi^+ \pi^-$	
8 ± 5		BRANDELIK	79C DASP	$e^+ e^-$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

<2.1	90	DOBBS	06A CLEO	$e^+ e^- \rightarrow \psi(2S)$	
<5	90	FELDMAN	77 MRK1	$e^+ e^-$	

NODE=M071R26;LINKAGE=AK

NODE=M071R;LINKAGE=N

NODE=M071R20
NODE=M071R20

NEW

¹ Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration. Using $\psi(3770) \rightarrow \pi^+ \pi^-$ for continuum subtraction.

NODE=M071R20;LINKAGE=ME

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT	Γ_{90}/Γ
<3.1	90	1 BAI	99C BES	$e^+ e^-$	

¹ Assuming $B(K_1(1400) \rightarrow K^* \pi) = 0.94 \pm 0.06$

NODE=M071R45
NODE=M071R45

NODE=M071R;LINKAGE=M3

$\Gamma(K_2^*(1430)^{\pm} K^{\mp})/\Gamma_{\text{total}}$				Γ_{91}/Γ
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
7.12 \pm 0.62 \pm 1.13 -0.61	251 \pm 22	ABLIKIM	12L BES3	$e^+ e^- \rightarrow \psi(2S)$

$\Gamma(K^+ K^- \pi^0)/\Gamma_{\text{total}}$				Γ_{92}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
4.07 \pm 0.16 \pm 0.26	0.9k	ABLIKIM	12L BES3	$e^+ e^- \rightarrow \psi(2S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<8.9	90	1	FRANKLIN	83 MRK2	$e^+ e^- \rightarrow \text{hadrons}$

$\Gamma(K^+ K^*(892)^- + \text{c.c.})/\Gamma_{\text{total}}$				Γ_{93}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2.9 \pm 0.4 OUR AVERAGE					Error includes scale factor of 1.2. $[(1.7^{+0.8}_{-0.7}) \times 10^{-5}]$
OUR 2012 AVERAGE]					
3.18 \pm 0.30 \pm 0.26		0.2k	ABLIKIM	12L BES3	$e^+ e^- \rightarrow \psi(2S)$
2.9 \pm 1.3 \pm 0.4		9.6 \pm 4.2	ABLIKIM	05I BES2	$e^+ e^- \rightarrow \psi(2S)$
1.3 \pm 1.0 \pm 0.3		7	ADAM	05 CLEO	$e^+ e^- \rightarrow \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<5.4	90		FRANKLIN	83 MRK2	$e^+ e^- \rightarrow \text{hadrons}$

$\Gamma(K^*(892)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$				Γ_{94}/Γ
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
10.9 \pm 2.0 OUR AVERAGE				
13.3 \pm 2.4 \pm 1.7	65.6 \pm 9.0	ABLIKIM	05I BES2	$e^+ e^- \rightarrow \psi(2S)$

$\Gamma(K^+ K^*(892)^- + \text{c.c.})/\Gamma(K^*(892)^0 \bar{K}^0 + \text{c.c.})$				Γ_{93}/Γ_{94}
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.16 \pm 0.06 OUR AVERAGE				
0.22 \pm 0.10 -0.14	ABLIKIM	05I BES2	$e^+ e^- \rightarrow \psi(2S)$	
0.14 \pm 0.08 -0.06	ADAM	05 CLEO	$e^+ e^- \rightarrow \psi(2S)$	

$\Gamma(\phi \pi^+ \pi^-)/\Gamma_{\text{total}}$				Γ_{95}/Γ	
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
1.17 \pm 0.29 OUR AVERAGE				Error includes scale factor of 1.7.	
2.40 \pm 0.94 \pm 0.04	10 \pm 4	1,2 AUBERT	07AK BABR	$10.6 e^+ e^- \rightarrow \pi^+ \pi^- K^+ K^- \gamma$	
0.9 \pm 0.2 \pm 0.1	47.6	BRIERE	05 CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow K^+ K^- \pi^+ \pi^-$	
1.5 \pm 0.2 \pm 0.2	51.5 \pm 8.3	3 BAI	03B BES	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^-$	
1 AUBERT 07AK reports $[\Gamma(\psi(2S) \rightarrow \phi \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [\Gamma(\psi(2S) \rightarrow e^+ e^-)] = (0.57 \pm 0.22 \pm 0.04) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+ e^-) = 2.37 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.					
2 Using $B(\phi \rightarrow K^+ K^-) = (49.3 \pm 0.6)\%$.					
3 Normalized to $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.305 \pm 0.016$.					

$\Gamma(\phi f_0(980) \rightarrow \pi^+ \pi^-)/\Gamma_{\text{total}}$				Γ_{96}/Γ	
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.68 \pm 0.24 OUR AVERAGE				Error includes scale factor of 1.1. $[(0.68 \pm 0.25) \times 10^{-4}]$	
OUR 2012 AVERAGE Scale factor = 1.1]					
1.43 \pm 0.70 \pm 0.02	6 \pm 3	1,2 AUBERT	07AK BABR	$10.6 e^+ e^- \rightarrow \pi^+ \pi^- K^+ K^- \gamma$	
0.6 \pm 0.2 \pm 0.1	18.4 \pm 6.4	3 BAI	03B BES	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^-$	
1 AUBERT 07AK reports $[\Gamma(\psi(2S) \rightarrow \phi f_0(980) \rightarrow \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [\Gamma(\psi(2S) \rightarrow e^+ e^-)] = (0.34 \pm 0.16 \pm 0.04) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+ e^-) = 2.37 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.					
2 Using $B(\phi \rightarrow K^+ K^-) = (49.3 \pm 0.6)\%$.					
3 Normalized to $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.305 \pm 0.016$.					

$\Gamma(2(K^+ K^-))/\Gamma_{\text{total}}$					Γ_{97}/Γ	NODE=M071S12 NODE=M071S12
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT		
0.6±0.1±0.1	59.2	BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow 2(K^+ K^-)$	
$\Gamma(\phi K^+ K^-)/\Gamma_{\text{total}}$					Γ_{98}/Γ	NODE=M071R81 NODE=M071R81
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT		
0.70±0.16 OUR AVERAGE						
0.8 ± 0.2 ± 0.1	36.8	BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow 2(K^+ K^-)$	
0.6 ± 0.2 ± 0.1	16.1 ± 5.0	¹ BAI	03B	BES	$\psi(2S) \rightarrow 2(K^+ K^-)$	
1 Normalized to $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.305 \pm 0.016$.						
$\Gamma(2(K^+ K^-)\pi^0)/\Gamma_{\text{total}}$					Γ_{99}/Γ	NODE=M071R81;LINKAGE=B3
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT		
1.1±0.2±0.2	44.7	BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow 2(K^+ K^-)\pi^0$	
$\Gamma(\phi\eta)/\Gamma_{\text{total}}$					Γ_{100}/Γ	NODE=M071R89 NODE=M071R89
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT		
3.10±0.31 OUR AVERAGE						NEW
[($2.8^{+1.0}_{-0.8}$) × 10^{-5} OUR 2012 AVERAGE]						
3.14 ± 0.23 ± 0.23	0.2k	ABLIKIM	12L	BES3	$e^+ e^- \rightarrow \psi(2S)$	
2.0 $^{+1.5}_{-1.1}$ ± 0.4	6	ADAM	05	CLEO	$e^+ e^- \rightarrow \psi(2S)$	
3.3 ± 1.1 ± 0.5	17	ABLIKIM	04K	BES	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\phi\eta')/\Gamma_{\text{total}}$					Γ_{101}/Γ	NODE=M071R90 NODE=M071R90
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT		
3.1±1.4±0.7	8	¹ ABLIKIM	04K	BES	$e^+ e^- \rightarrow \psi(2S)$	
1 Calculated combining $\eta' \rightarrow \gamma\rho$ and $\eta\pi^+\pi^-$ channels.						
$\Gamma(\omega\eta')/\Gamma_{\text{total}}$					Γ_{102}/Γ	NODE=M071R91 NODE=M071R91
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT		
3.2$^{+2.4}_{-2.0}$±0.7	4	¹ ABLIKIM	04K	BES	$e^+ e^- \rightarrow \psi(2S)$	
1 Calculated combining $\eta' \rightarrow \gamma\rho$ and $\eta\pi^+\pi^-$ channels.						
$\Gamma(\omega\pi^0)/\Gamma_{\text{total}}$					Γ_{103}/Γ	NODE=M071R92 NODE=M071R92
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT		
2.1 ± 0.6 OUR AVERAGE						
2.5 $^{+1.2}_{-1.0}$ ± 0.2	14	ADAM	05	CLEO	$e^+ e^- \rightarrow \psi(2S)$	
1.87 $^{+0.68}_{-0.62}$ ± 0.28	14	ABLIKIM	04L	BES	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\rho\eta')/\Gamma_{\text{total}}$					Γ_{104}/Γ	NODE=M071R93 NODE=M071R93
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT		
1.87$^{+1.64}_{-1.11}$±0.33	2	ABLIKIM	04L	BES	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\rho\eta)/\Gamma_{\text{total}}$					Γ_{105}/Γ	NODE=M071R94 NODE=M071R94
VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT		
2.2 ± 0.6 OUR AVERAGE		Error includes scale factor of 1.1.				
3.0 $^{+1.1}_{-0.9}$ ± 0.2	18	ADAM	05	CLEO	$e^+ e^- \rightarrow \psi(2S)$	
1.78 $^{+0.67}_{-0.62}$ ± 0.17	13	ABLIKIM	04L	BES	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\omega\eta)/\Gamma_{\text{total}}$					Γ_{106}/Γ	NODE=M071R95 NODE=M071R95
VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT		
<1.1	90	ADAM	05	CLEO	$e^+ e^- \rightarrow \psi(2S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<3.1	90	ABLIKIM	04K	BES	$e^+ e^- \rightarrow \psi(2S)$	

$\Gamma(\phi\pi^0)/\Gamma_{\text{total}}$	Γ_{107}/Γ	NODE=M071R96 NODE=M071R96
$\text{VALUE (units } 10^{-5}\text{)} \quad CL\%$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<0.04 \text{ (CL = 90\%)} \quad [<0.4 \times 10^{-5} \text{ (CL = 90\%) OUR 2012 BEST LIMIT}]$		
$<\mathbf{0.04}$	90 ABLIKIM 12L BES3 $e^+ e^- \rightarrow \psi(2S)$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$		
<0.7	90 ADAM 05 CLEO $e^+ e^- \rightarrow \psi(2S)$	
<0.4	90 ABLIKIM 04K BES $e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\eta_c\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$	Γ_{108}/Γ	NODE=M071R03 NODE=M071R03
$\text{VALUE (units } 10^{-3}\text{)} \quad CL\%$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<\mathbf{1.0}$	90 PEDLAR 07 CLEO $e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(p\bar{p}K^+K^-)/\Gamma_{\text{total}}$	Γ_{109}/Γ	NODE=M071S16 NODE=M071S16
$\text{VALUE (units } 10^{-5}\text{)} \quad EVTS$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$2.7 \pm 0.6 \pm 0.4$	30.1 BRIERE 05 CLEO $e^+ e^- \rightarrow \psi(2S) \rightarrow p\bar{p}K^+K^-$	
$\Gamma(\bar{\Lambda}nK_S^0 + \text{c.c.})/\Gamma_{\text{total}}$	Γ_{110}/Γ	NODE=M071R08 NODE=M071R08
$\text{VALUE (units } 10^{-4}\text{)} \quad EVTS$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$0.81 \pm 0.11 \pm 0.14$	50 ABLIKIM 08C BES2 $e^+ e^- \rightarrow J/\psi$	
¹ Using $B(\bar{\Lambda} \rightarrow \bar{p}\pi^+) = 63.9\%$ and $B(K_S^0 \rightarrow \pi^+\pi^-) = 69.2\%.$		
$\Gamma(\phi f_2'(1525))/\Gamma_{\text{total}}$	Γ_{111}/Γ	NODE=M071R67 NODE=M071R67
$\text{VALUE (units } 10^{-4}\text{)} \quad CL\% \quad EVTS$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$0.44 \pm 0.12 \pm 0.11$	$20 \pm 6 \quad \text{BAI} \quad 04C \quad \psi(2S) \rightarrow 2(K^+K^-)$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$		
<0.45	90 BAI 98J BES $e^+ e^- \rightarrow 2(K^+K^-)$	
$\Gamma(\Theta(1540)\bar{\Theta}(1540) \rightarrow K_S^0 p K^- \bar{n} + \text{c.c.})/\Gamma_{\text{total}}$	Γ_{112}/Γ	NODE=M071S01 NODE=M071S01
$\text{VALUE (units } 10^{-5}\text{)} \quad CL\%$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<\mathbf{0.88}$	90 BAI 04G BES2 $e^+ e^-$	
$\Gamma(\Theta(1540)K^-\bar{n} \rightarrow K_S^0 p K^- \bar{n})/\Gamma_{\text{total}}$	Γ_{113}/Γ	NODE=M071S02 NODE=M071S02
$\text{VALUE (units } 10^{-5}\text{)} \quad CL\%$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<\mathbf{1.0}$	90 BAI 04G BES2 $e^+ e^-$	
$\Gamma(\Theta(1540)K_S^0\bar{p} \rightarrow K_S^0\bar{p}K^+n)/\Gamma_{\text{total}}$	Γ_{114}/Γ	NODE=M071S03 NODE=M071S03
$\text{VALUE (units } 10^{-5}\text{)} \quad CL\%$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<\mathbf{0.70}$	90 BAI 04G BES2 $e^+ e^-$	
$\Gamma(\bar{\Theta}(1540)K^+n \rightarrow K_S^0\bar{p}K^+n)/\Gamma_{\text{total}}$	Γ_{115}/Γ	NODE=M071S04 NODE=M071S04
$\text{VALUE (units } 10^{-5}\text{)} \quad CL\%$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<\mathbf{2.6}$	90 BAI 04G BES2 $e^+ e^-$	
$\Gamma(\bar{\Theta}(1540)K_S^0p \rightarrow K_S^0pK^-\bar{n})/\Gamma_{\text{total}}$	Γ_{116}/Γ	NODE=M071S05 NODE=M071S05
$\text{VALUE (units } 10^{-5}\text{)} \quad CL\%$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<\mathbf{0.60}$	90 BAI 04G BES2 $e^+ e^-$	
$\Gamma(K_S^0K_S^0)/\Gamma_{\text{total}}$	Γ_{117}/Γ	NODE=M071R88 NODE=M071R88
$\text{VALUE (units } 10^{-4}\text{)}$	$\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}$	
$<\mathbf{0.046}$	¹ BAI 04D BES $e^+ e^-$	

RADIATIVE DECAYS

$\Gamma(\gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$					Γ_{118}/Γ	NODE=M071R55
VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT		NODE=M071R55
9.84 ± 0.31 OUR FIT [(9.68 ± 0.31) $\times 10^{-2}$ OUR 2012 FIT]						NEW
9.2 ± 0.4 OUR AVERAGE						
$9.22 \pm 0.11 \pm 0.46$	72600	ATHAR	04	CLEO $e^+ e^- \rightarrow \gamma X$		
$9.9 \pm 0.5 \pm 0.8$		¹ GAISER	86	CBAL $e^+ e^- \rightarrow \gamma X$		
7.2 ± 2.3		¹ BIDDICK	77	CNTR $e^+ e^- \rightarrow \gamma X$		
7.5 ± 2.6		¹ WHITAKER	76	MRK1 $e^+ e^-$		

¹ Angular distribution ($1+\cos^2\theta$) assumed.

$\Gamma(\gamma\chi_{c1}(1P))/\Gamma_{\text{total}}$	Γ_{119}/Γ				
<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
9.3 \pm 0.4 OUR FIT					
[(9.2 ± 0.4) $\times 10^{-2}$ OUR 2012 FIT]					
8.9 \pm 0.5 OUR AVERAGE					
9.07 \pm 0.11 \pm 0.54	76700	ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
9.0 \pm 0.5 \pm 0.7		1 GAISER	86	CBAL	$e^+ e^- \rightarrow \gamma X$
7.1 \pm 1.9		2 BIDDICK	77	CNTR	$e^+ e^- \rightarrow \gamma X$
1 Angular distribution ($1 - 0.189 \cos^2\theta$) assumed.					
2 Valid for isotropic distribution of the photon.					

$\Gamma(\gamma\chi_{c2}(1P))/\Gamma_{\text{total}}$	Γ_{120}/Γ				
<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
8.76 \pm 0.34 OUR FIT					
[(8.72 ± 0.34) $\times 10^{-2}$ OUR 2012 FIT]					
8.8 \pm 0.5 OUR AVERAGE Error includes scale factor of 1.1.					
9.33 \pm 0.14 \pm 0.61	79300	ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
8.0 \pm 0.5 \pm 0.7		1 GAISER	86	CBAL	$e^+ e^- \rightarrow \gamma X$
7.0 \pm 2.0		2 BIDDICK	77	CNTR	$e^+ e^- \rightarrow \gamma X$
1 Angular distribution ($1 - 0.052 \cos^2\theta$) assumed.					
2 Valid for isotropic distribution of the photon.					

$[\Gamma(\gamma\chi_{c0}(1P)) + \Gamma(\gamma\chi_{c1}(1P)) + \Gamma(\gamma\chi_{c2}(1P))] / \Gamma_{\text{total}}$	$(\Gamma_{118} + \Gamma_{119} + \Gamma_{120}) / \Gamma$				
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
• • • We do not use the following data for averages, fits, limits, etc. • • •					
27.6 \pm 0.3 \pm 2.0		1 ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
1 Not independent from ATHAR 04 measurements of $B(\gamma\chi_{cJ})$.					
$\Gamma(\gamma\chi_{c0}(1P))/\Gamma(\gamma\chi_{c1}(1P))$	$\Gamma_{118}/\Gamma_{119}$				
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.02 \pm 0.01 \pm 0.07		1 ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
1 Not independent from ATHAR 04 measurements of $B(\gamma\chi_{cJ})$.					
$\Gamma(\gamma\chi_{c2}(1P))/\Gamma(\gamma\chi_{c1}(1P))$	$\Gamma_{120}/\Gamma_{119}$				
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.03 \pm 0.02 \pm 0.03		1 ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
1 Not independent from ATHAR 04 measurements of $B(\gamma\chi_{cJ})$.					
$\Gamma(\gamma\chi_{c0}(1P))/\Gamma(\gamma\chi_{c2}(1P))$	$\Gamma_{118}/\Gamma_{120}$				
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.99 \pm 0.02 \pm 0.08		1 ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
1 Not independent from ATHAR 04 measurements of $B(\gamma\chi_{cJ})$.					
$\Gamma(\gamma\eta_c(1S))/\Gamma_{\text{total}}$	Γ_{121}/Γ				
<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	

0.34 \pm 0.05 OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.									
0.432 \pm 0.016 \pm 0.060										
MITCHELL										
0.32 \pm 0.04 \pm 0.06										
2560										
1 ATHAR										
0.28 \pm 0.06										
2 GAISER										
86 CBAL										
1 ATHAR 04 used $\Gamma_{\eta_c(1S)} = 24.8 \pm 4.9$ MeV to obtain this result.										
2 GAISER 86 used $\Gamma_{\eta_c(1S)} = 11.5 \pm 4.5$ MeV to obtain this result.										

NODE=M071R58

NODE=M071R58

NEW

NODE=M071R;LINKAGE=G

NODE=M071R;LINKAGE=B

NODE=M071R59

NODE=M071R59

NEW

NODE=M071R;LINKAGE=F

NODE=M071R59;LINKAGE=B

NODE=M071R19

NODE=M071R19

NODE=M071R;LINKAGE=AH

NODE=M071R97

NODE=M071R97

NODE=M071R97;LINKAGE=AH

NODE=M071R98

NODE=M071R98

NODE=M071R98;LINKAGE=AH

NODE=M071R99

NODE=M071R99

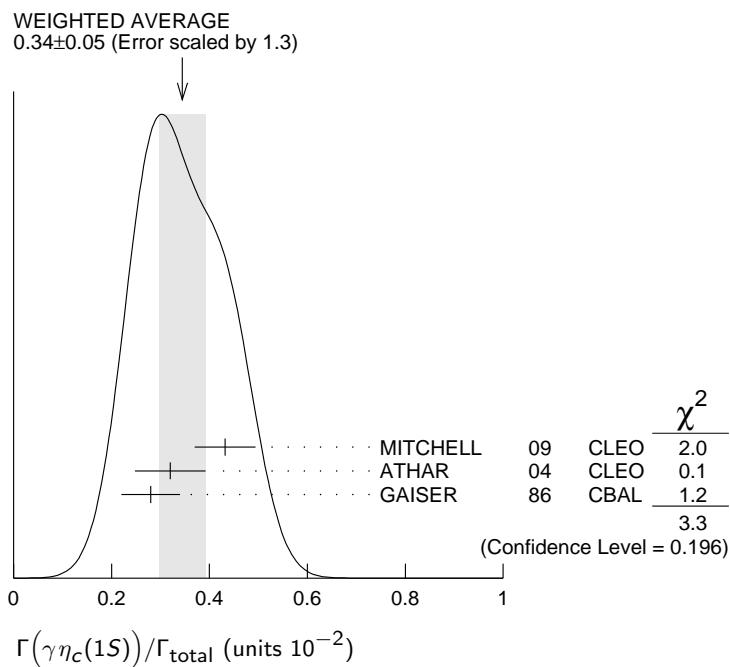
NODE=M071R99;LINKAGE=AH

NODE=M071R60

NODE=M071R60

NODE=M071R60;LINKAGE=AT

NODE=M071R60;LINKAGE=GA

 **$\Gamma(\gamma\eta_c(2S))/\Gamma_{\text{total}}$**

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
7±2±4		1 ABLIKIM 12G	BES3	$\psi(2S) \rightarrow \gamma K^0 K\pi, K\bar{K}\pi^0$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 8	90	2 CRONIN-HEN..10	CLEO	$\psi(2S) \rightarrow \gamma K\bar{K}\pi$
<20	90	ATHAR 04	CLEO	$e^+e^- \rightarrow \gamma X$

20–130	95	EDWARDS 82C	CBAL	$e^+e^- \rightarrow \gamma X$
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¹ ABLIKIM 12G reports $[\Gamma(\psi(2S) \rightarrow \gamma\eta_c(2S))/\Gamma_{\text{total}}] \times [B(\eta_c(2S) \rightarrow K\bar{K}\pi)] = (1.30 \pm 0.20 \pm 0.30) \times 10^{-5}$ which we divide by our best value $B(\eta_c(2S) \rightarrow K\bar{K}\pi) = (1.9 \pm 1.2) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² CRONIN-HENNESSY 10 reports $[\Gamma(\psi(2S) \rightarrow \gamma\eta_c(2S))/\Gamma_{\text{total}}] \times [B(\eta_c(2S) \rightarrow K\bar{K}\pi)] < 14.5 \times 10^{-6}$ which we divide by our best value $B(\eta_c(2S) \rightarrow K\bar{K}\pi) = 1.9 \times 10^{-2}$. This measurement assumes $\Gamma(\eta_c(2S)) = 14$ MeV. CRONIN-HENNESSY 10 gives the analytic dependence of limits on width.

 $\Gamma(\gamma\pi^0)/\Gamma_{\text{total}}$

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
1.58±0.40±0.13		37	ABLIKIM 10F	BES3	$\psi(2S) \rightarrow \gamma\pi^0$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 5	90	PEDLAR 09	CLE3	$\psi(2S) \rightarrow \gamma X$
<5400	95	¹ LIBERMAN 75	SPEC	e^+e^-
< 1×10^4	90	WIIK 75	DASP	e^+e^-

¹ Restated by us using $B(\psi(2S) \rightarrow \mu^+\mu^-) = 0.0077$.

 $\Gamma(\gamma\eta'(958))/\Gamma_{\text{total}}$

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
1.23±0.06 OUR AVERAGE					

1.26±0.03±0.08	2226	¹ ABLIKIM 10F	BES3	$\psi(2S) \rightarrow 3\gamma\pi^+\pi^-, 2\gamma\pi^+\pi^-$
1.19±0.08±0.03		PEDLAR 09	CLE3	$\psi(2S) \rightarrow \gamma X$
1.24±0.27±0.15	23	ABLIKIM 06R	BES2	$e^+e^- \rightarrow \psi(2S)$
1.54±0.31±0.20	~ 43	BAI 98F	BES	$\psi(2S) \rightarrow \pi^+\pi^- 2\gamma, \pi^+\pi^- 3\gamma$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 60	90	2 BRAUNSCH... 77	DASP	e^+e^-
< 11	90	3 BARTEL 76	CNTR	e^+e^-

¹ Combining the results from $\eta' \rightarrow \pi^+\pi^-\eta$ and $\eta' \rightarrow \pi^+\pi^-\gamma$ decay modes.

² Restated by us using total decay width 228 keV.

³ The value is normalized to the branching ratio for $\Gamma(J/\psi(1S)\eta)/\Gamma_{\text{total}}$.

 Γ_{122}/Γ

NODE=M071R62
NODE=M071R62

NODE=M071R62;LINKAGE=AB

NODE=M071R62;LINKAGE=CR

NODE=M071R42
NODE=M071R42

NODE=M071R;LINKAGE=U

NODE=M071R44
NODE=M071R44

NODE=M071R44;LINKAGE=AB
NODE=M071R;LINKAGE=R
NODE=M071R;LINKAGE=C

 Γ_{123}/Γ

NODE=M071R42
NODE=M071R42

NODE=M071R;LINKAGE=U

 Γ_{124}/Γ

NODE=M071R44
NODE=M071R44

$\Gamma(\gamma f_2(1270))/\Gamma_{\text{total}}$					Γ_{125}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$2.12 \pm 0.19 \pm 0.32$		1,2 BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi\pi$	
• • • We do not use the following data for averages, fits, limits, etc.				• • •	
$2.08 \pm 0.19 \pm 0.33$	200.6 ± 18.8	¹ BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$	OCCUR=2
$2.90 \pm 1.08 \pm 1.07$	29.9 ± 11.1	¹ BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi^0\pi^0$	OCCUR=3
1 Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.					
2 Combining the results from $\pi^+\pi^-$ and $\pi^0\pi^0$ decay modes.					

$\Gamma(\gamma f_0(1710) \rightarrow \gamma\pi\pi)/\Gamma_{\text{total}}$					Γ_{127}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$0.301 \pm 0.041 \pm 0.124$	35.6 ± 4.8	¹ BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$	NODE=M071R;LINKAGE=3B
1 Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.					

$\Gamma(\gamma f_0(1710) \rightarrow \gamma K\bar{K})/\Gamma_{\text{total}}$					Γ_{128}/Γ
<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.604 \pm 0.090 \pm 0.132$		39.6 ± 5.9	1,2 BAI	03C BES	$\psi(2S) \rightarrow \gamma K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc.			• • •		
< 1.56	90	6.8 ± 3.1	1,2 BAI	03C BES	$\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
1 Includes unknown branching fractions to K^+K^- or $K_S^0 K_S^0$. We have multiplied the K^+K^- result by a factor of 2 and the $K_S^0 K_S^0$ result by a factor of 4 to obtain the $K\bar{K}$ result.					
2 Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.					

$\Gamma(\gamma\eta)/\Gamma_{\text{total}}$					Γ_{130}/Γ
<u>VALUE (units 10^{-6})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$1.38 \pm 0.48 \pm 0.09$		13	¹ ABLIKIM	10F BES3	$\psi(2S) \rightarrow \gamma\pi^+\pi^-\pi^0, \gamma 3\pi^0$
• • • We do not use the following data for averages, fits, limits, etc.		• • •			
< 2	90	PEDLAR	09	CLE3	$\psi(2S) \rightarrow \gamma X$
< 90	90	BAI	98F	BES	$\psi(2S) \rightarrow \pi^+\pi^-3\gamma$
< 200	90	YAMADA	77	DASP	$e^+e^- \rightarrow 3\gamma$
1 Combining the results from $\eta \rightarrow \pi^+\pi^-\pi^0$ and $\eta \rightarrow 3\pi^0$ decay modes.					

$\Gamma(\gamma\eta\pi^+\pi^-)/\Gamma_{\text{total}}$					Γ_{131}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$8.71 \pm 1.25 \pm 1.64$	418	ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma\eta\pi^+\pi^-$	

$\Gamma(\gamma\eta(1405) \rightarrow \gamma K\bar{K}\pi)/\Gamma_{\text{total}}$					Γ_{133}/Γ
<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
< 0.9	90	ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma K_S^0 K^+\pi^- + \text{c.c.}$	NODE=M071R61 NODE=M071R61
• • • We do not use the following data for averages, fits, limits, etc.		• • •			
< 1.3	90	ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma K^+K^-\pi^0$	OCCUR=2
< 1.2	90	¹ SCHARRE	80	MRK1	$e^+e^- \rightarrow K\bar{K}\pi$
1 Includes unknown branching fraction $\eta(1405) \rightarrow K\bar{K}\pi$.					

$\Gamma(\gamma\eta(1405) \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}$					Γ_{134}/Γ
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$0.36 \pm 0.25 \pm 0.05$	10	ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma\eta\pi^+\pi^-$	NODE=M071R05 NODE=M071R05

$\Gamma(\gamma\eta(1475) \rightarrow K\bar{K}\pi)/\Gamma_{\text{total}}$					Γ_{136}/Γ
<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
< 1.4	90	ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma K^+K^-\pi^0$	NODE=M071R06 NODE=M071R06
• • • We do not use the following data for averages, fits, limits, etc.		• • •			
< 1.5	90	ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma K_S^0 K^+\pi^- + \text{c.c.}$	OCCUR=2

$\Gamma(\gamma\eta(1475) \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}$					Γ_{137}/Γ
<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
< 0.88	90	ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma\eta\pi^+\pi^-$	NODE=M071R07 NODE=M071R07

$\Gamma(\gamma 2(\pi^+ \pi^-))/\Gamma_{\text{total}}$					Γ_{138}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S28 NODE=M071S28
$39.6 \pm 2.8 \pm 5.0$	583	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\gamma K^{*0} K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$					Γ_{139}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S29 NODE=M071S29
$37.0 \pm 6.1 \pm 7.2$	237	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\gamma K^{*0} \bar{K}^{*0})/\Gamma_{\text{total}}$					Γ_{140}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S30 NODE=M071S30
$24.0 \pm 4.5 \pm 5.0$	41	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\gamma K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$					Γ_{141}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S31 NODE=M071S31
$25.6 \pm 3.6 \pm 3.6$	115	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\gamma K^+ K^- \pi^+ \pi^-)/\Gamma_{\text{total}}$					Γ_{142}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S32 NODE=M071S32
$19.1 \pm 2.7 \pm 4.3$	132	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\gamma p\bar{p})/\Gamma_{\text{total}}$					Γ_{143}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S33 NODE=M071S33
3.9 ± 0.5 OUR AVERAGE	Error includes scale factor of 2.0.					
4.18 $\pm 0.26 \pm 0.18$	348	¹ ALEXANDER	10	CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$	
2.9 $\pm 0.4 \pm 0.4$	142	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	
¹ From a fit of the $p\bar{p}$ mass distribution to a combination of $\gamma f_2(1950)$, $\gamma f_2(2150)$, and $\gamma p\bar{p}$ phase space, for $M(p\bar{p}) < 2.85$ GeV, and accounting for backgrounds from $\psi(2S) \rightarrow \pi^0 p\bar{p}$ and continuum.						
$\Gamma(\gamma f_2(1950) \rightarrow \gamma p\bar{p})/\Gamma_{\text{total}}$					Γ_{144}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S46 NODE=M071S46
$1.2 \pm 0.2 \pm 0.1$	111	¹ ALEXANDER	10	CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$	
¹ From a fit of the $p\bar{p}$ mass distribution to a combination of $\gamma f_2(1950)$, $\gamma f_2(2150)$, and $\gamma p\bar{p}$ phase space, for $M(p\bar{p}) < 2.85$ GeV, and accounting for backgrounds from $\psi(2S) \rightarrow \pi^0 p\bar{p}$ and continuum.						
$\Gamma(\gamma f_2(2150) \rightarrow \gamma p\bar{p})/\Gamma_{\text{total}}$					Γ_{145}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S47 NODE=M071S47
$0.72 \pm 0.18 \pm 0.03$	73	¹ ALEXANDER	10	CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$	
¹ From a fit of the $p\bar{p}$ mass distribution to a combination of $\gamma f_2(1950)$, $\gamma f_2(2150)$, and $\gamma p\bar{p}$ phase space, for $M(p\bar{p}) < 2.85$ GeV, and accounting for backgrounds from $\psi(2S) \rightarrow \pi^0 p\bar{p}$ and continuum.						
$\Gamma(\gamma X(1835) \rightarrow \gamma p\bar{p})/\Gamma_{\text{total}}$					Γ_{146}/Γ	
<u>VALUE (units 10^{-6})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S48 NODE=M071S48
$4.57 \pm 0.36 \pm 1.77$		ABLIKIM	12D	BES3	$J/\psi \rightarrow \gamma p\bar{p}$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.6	90	ALEXANDER	10	CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$	
<5.4	90	ABLIKIM	07D	BES	$\psi(2S) \rightarrow \gamma p\bar{p}$	
$\Gamma(\gamma X \rightarrow \gamma p\bar{p})/\Gamma_{\text{total}}$					Γ_{147}/Γ	
For a narrow resonance in the range $2.2 < M(X) < 2.8$ GeV.						
<u>VALUE (units 10^{-6})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S49 NODE=M071S49 NODE=M071S49
<2	90	ALEXANDER	10	CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$	
$\Gamma(\gamma \pi^+ \pi^- p\bar{p})/\Gamma_{\text{total}}$					Γ_{148}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S34 NODE=M071S34
$2.8 \pm 1.2 \pm 0.7$	17	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	
$\Gamma(\gamma 2(\pi^+ \pi^-) K^+ K^-)/\Gamma_{\text{total}}$					Γ_{149}/Γ	
<u>VALUE (units 10^{-5})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		NODE=M071S35 NODE=M071S35
<22	90	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$	

$\Gamma(\gamma 3(\pi^+\pi^-))/\Gamma_{\text{total}}$		Γ_{150}/Γ			
VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT	
<17	90	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$
$\Gamma(\gamma K^+ K^- K^+ K^-)/\Gamma_{\text{total}}$				Γ_{151}/Γ	
VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT	
<4	90	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$
$\Gamma(\gamma\gamma J/\psi)/\Gamma_{\text{total}}$				Γ_{152}/Γ	
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
$3.1 \pm 0.6^{+0.8}_{-1.0}$	1.1k	ABLIKIM	120	BES3	$e^+ e^- \rightarrow \psi(2S)$

$\psi(2S)$ CROSS-PARTICLE BRANCHING RATIOS

For measurements involving $B(\psi(2S) \rightarrow \gamma \chi_{cJ}(1P)) \times B(\chi_{cJ}(1P) \rightarrow X)$
see the corresponding entries in the $\chi_{cJ}(1P)$ sections.

MULTIPOLE AMPLITUDE RATIOS IN RADIATIVE DECAYS

$\psi(2S) \rightarrow \gamma \chi_{cJ}(1P)$ and $\chi_{cJ} \rightarrow \gamma J/\psi(1S)$

$a_2(\chi_{c1})/a_2(\chi_{c2})$ Magnetic quadrupole transition amplitude ratio

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
67^{+19}_{-13}	59k	1 ARTUSO	09	CLEO $\psi(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$

¹ Statistical and systematic errors combined. Using values from fits with floating M2 amplitudes $a_2(\chi_{c1})$, $a_2(\chi_{c2})$, $b_2(\chi_{c1})$, $b_2(\chi_{c2})$ and fixed E3 amplitudes of $a_3(\chi_{c2}) = b_3(\chi_{c2}) = 0$. Not independent of values for $a_2(\chi_{c1}(1P))$ and $a_2(\chi_{c2}(1P))$ from ARTUSO 09.

$b_2(\chi_{c2})/b_2(\chi_{c1})$ Magnetic quadrupole transition amplitude ratio

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
37^{+53}_{-47}	59k	1 ARTUSO	09	CLEO $\psi(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$

¹ Statistical and systematic errors combined. Using values from fits with floating M2 amplitudes $a_2(\chi_{c1})$, $a_2(\chi_{c2})$, $b_2(\chi_{c1})$, $b_2(\chi_{c2})$ and fixed E3 amplitudes of $a_3(\chi_{c2}) = b_3(\chi_{c2}) = 0$. Not independent of values for $b_2(\chi_{c1}(1P))$ and $b_2(\chi_{c2}(1P))$ from ARTUSO 09.

$\psi(2S)$ REFERENCES

ABLIKIM	13A	PRL 110 022001	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54834
ABLIKIM	13D	PR D87 012007	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54879
ABLIKIM	13F	arXiv:1211.4682 (PR D)	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54920
AAIJ	12H	EPJ C72 1972	R. Aaij <i>et al.</i>	(LHCb Collab.)	REFID=54056
ABLIKIM	12D	PRL 108 112003	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54269
ABLIKIM	12G	PRL 109 042003	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54272
ABLIKIM	12H	PL B710 594	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54273
ABLIKIM	12L	PR D86 072011	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54739
ABLIKIM	12M	PR D86 092008	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54740
ABLIKIM	12O	PRL 109 172002	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=54742
ANASHIN	12	PL B711 280	V.V. Anashin <i>et al.</i>	(KEDR Collab.)	REFID=54038
LEES	12E	PR D85 112009	J.P. Lees <i>et al.</i>	(BABAR Collab.)	REFID=54297
METREVELI	12	PR D85 092007	Z. Metreveli <i>et al.</i>	(NWES, FLOR, WAYN+)	REFID=54304
GE	11	PR D84 032008	J.Y. Ge <i>et al.</i>	(CLEO Collab.)	REFID=53960
ABLIKIM	10B	PRL 104 132002	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=53348
ABLIKIM	10F	PRL 105 261801	M. Ablikim <i>et al.</i>	(BES III Collab.)	REFID=53630
ALEXANDER	10	PR D82 092002	J.P. Alexander <i>et al.</i>	(CLEO Collab.)	REFID=53525
CRONIN-HEN... ¹⁰	PR D81 052002	D. Cronin-Hennessey <i>et al.</i>	(CLEO Collab.)	REFID=53233	
ADAMS	09	PR D80 051106	G.S. Adams <i>et al.</i>	(CLEO Collab.)	REFID=53103
ARTUSO	09	PR D80 112003	M. Artuso <i>et al.</i>	(CLEO Collab.)	REFID=53206
LIBBY	09	PR D80 072002	J. Libby <i>et al.</i>	(CLEO Collab.)	REFID=53124
MITCHELL	09	PRL 102 011801	R.E. Mitchell <i>et al.</i>	(CLEO Collab.)	REFID=52676
PEDLAR	09	PR D79 111101	T.K. Pedlar <i>et al.</i>	(CLEO Collab.)	REFID=52998
ABLIKIM	08B	PL B659 74	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=52129
ABLIKIM	08C	PL B659 789	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=52130
DOBBS	08A	PRL 101 182003	S. Dobbs <i>et al.</i>	(CLEO Collab.)	REFID=52579
MENDEZ	08	PR D78 011102	H. Mendez <i>et al.</i>	(CLEO Collab.)	REFID=52684
PDG	08	PL B667 1	C. Amsler <i>et al.</i>	(PDG Collab.)	REFID=52166
ABLIKIM	07C	PL B648 149	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=51636
ABLIKIM	07D	PR D 99 011802	M. Ablikim <i>et al.</i>	(BES II Collab.)	REFID=51725
ABLIKIM	07H	PR D76 092003	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=52046
ANASHIN	07	JETPL 85 347	V.V. Anashin <i>et al.</i>	(KEDR Collab.)	REFID=51655

Translated from ZETFP 85 429.

ANDREOTTI	07	PL B654 74	M. Andreotti <i>et al.</i>	(Femilab E835 Collab.)	REFID=51944
AUBERT	07AK	PR D76 012008	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=51908
AUBERT	07AU	PR D76 092005	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=52049
Also		PR D77 119902E (errat.)	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=52266
AUBERT	07BD	PR D76 092006	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=52050
PDG	07	Unofficial 2007 WWW edition		(PDC Collab.)	REFID=52717;ERROR=1
PEDLAR	07	PR D75 011102	T.K. Pedlar <i>et al.</i>	(CLEO Collab.)	REFID=51630
ABLIKIM	06G	PR D73 052004	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=51048
ABLIKIM	06I	PR D74 012004	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=51126
ABLIKIM	06L	PRL 97 121801	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=51129
ABLIKIM	06R	PR D74 072001	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=51447
ABLIKIM	06W	PR D74 112003	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=51560
ADAM	06	PRL 96 082004	N.E. Adam <i>et al.</i>	(CLEO Collab.)	REFID=50989
AUBERT	06B	PR D73 012005	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=51026
AUBERT	06D	PR D73 052003	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=51047
AUBERT,BE	06D	PR D74 091103	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=51511
DOBBS	06A	PR D74 011105	S. Dobbs <i>et al.</i>	(CLEO Collab.)	REFID=51158
ABLIKIM	05E	PR D71 072006	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=50757
ABLIKIM	05H	PR D72 012002	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=50759
ABLIKIM	05I	PL B614 37	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=50758
ABLIKIM	05J	PL B619 247	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=50760
ABLIKIM	05O	PL B630 21	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=50846
ADAM	05	PRL 94 012005	N.E. Adam <i>et al.</i>	(CLEO Collab.)	REFID=50451
ADAM	05A	PRL 94 232002	N.E. Adam <i>et al.</i>	(CLEO Collab.)	REFID=50763
ANDREOTTI	05	PR D71 032006	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)	REFID=50497
AUBERT	05D	PR D71 052001	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=50509
BRIERE	05	PRL 95 062001	R.A. Briere <i>et al.</i>	(CLEO Collab.)	REFID=50785
PEDLAR	05	PR D72 051108	T.K. Pedlar <i>et al.</i>	(CLEO Collab.)	REFID=50808
ROSNER	05	PRL 95 102003	J.L. Rosner <i>et al.</i>	(CLEO Collab.)	REFID=50812
ABLIKIM	04B	PR D70 012003	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=49741
ABLIKIM	04K	PR D70 112003	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=50327
ABLIKIM	04L	PR D70 112007	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=50328
ATHAR	04	PR D70 112002	S.B. Athar <i>et al.</i>	(CLEO Collab.)	REFID=50331
BAI	04B	PRL 92 052001	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49608
BAI	04C	PR D69 072001	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49749
BAI	04D	PL B589 7	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49750
BAI	04G	PR D70 012004	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49753
BAI	04I	PR D70 012006	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49755
PDG	04	PL B592 1	S. Eidelman <i>et al.</i>	(PDG Collab.)	REFID=49653
SETH	04	PR D69 097503	K.K. Seth		REFID=49779
AULCHENKO	03	PL B573 63	V.M. Aulchenko <i>et al.</i>		REFID=49579
BAI	03B	PR D67 052002	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49186
BAI	03C	PR D67 032004	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49190
AUBERT	02B	PR D65 031101	B. Aubert <i>et al.</i>	(BaBar Collab.)	REFID=48548
BAI	02	PR D65 052004	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=48578
BAI	02B	PL B550 24	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=49171
BAI	02C	PRL 88 101802	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=50506
PDG	02	PR D66 010001	K. Hagiwara <i>et al.</i>		REFID=48632
BAI	01	PR D63 032002	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=48003
AMBROGIANI	00A	PR D62 032004	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)	REFID=47939
ARTAMONOV	00	PL B474 427	S. Artamonov <i>et al.</i>		REFID=47424
BAI	00	PRL 84 594	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=50503
BAI	99C	PRL 83 1918	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=47420
BAI	99E	PR D57 3854	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=46339
BAI	99F	PR D58 097101	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=46340
BAI	99J	PRL 81 5080	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=46554
ARMSTRONG	97	PR D55 1153	T.A. Armstrong <i>et al.</i>	(E760 Collab.)	REFID=45416
GРИБУШИН	96	PR D53 4723	A. Gribushin <i>et al.</i>	(E672 Collab., E706 Collab.)	REFID=44739
ARMSTRONG	93B	PR D47 772	T.A. Armstrong <i>et al.</i>	(FNAL E760 Collab.)	REFID=43307
ALEXANDER	89	NP B320 45	J.P. Alexander <i>et al.</i>	(LBL, MICH, SLAC)	REFID=40345
COHEN	87	RMP 59 1121	E.R. Cohen, B.N. Taylor	(RISC, NBS)	REFID=11616
GAISER	86	PR D34 711	J. Gaisser <i>et al.</i>	(Crystal Ball Collab.)	REFID=22012
KURAEV	85	SJNP 41 466	E.A. Kuraev, V.S. Fadin	(NOVO)	REFID=40033
		Translated from YAF 41 733.			
FRANKLIN	83	PRL 51 963	M.E.B. Franklin <i>et al.</i>	(LBL, SLAC)	REFID=22216
EDWARDS	82C	PRL 48 70	C. Edwards <i>et al.</i>	(CIT, HARV, PRIN+)	REFID=22173
LEMOIGNE	82	PL 113B 509	Y. Lemoigne <i>et al.</i>	(SACL, LOIC, SHMP+)	REFID=22084
HIMEL	80	PRl 44 920	T. Himel <i>et al.</i>	(LBL, SLAC)	REFID=22119
OREGLIA	80	PRL 45 959	M.J. Oreglia <i>et al.</i>	(SLAC, CIT, HARV+)	REFID=22207
SCHARRE	80	PL 97B 329	D.L. Scharre <i>et al.</i>	(SLAC, LBL)	REFID=21329
ZHOLENTZ	80	PL 96B 214	A.A. Zholents <i>et al.</i>	(NOVO)	REFID=10320
Also		SJNP 34 814	A.A. Zholents <i>et al.</i>	(NOVO)	REFID=10321
		Translated from YAF 34 1471.			
BRANDELIK	79B	NP B160 426	R. Brandelik <i>et al.</i>	(DASP Collab.)	REFID=22115
BRANDELIK	79C	ZPHY C1 233	R. Brandelik <i>et al.</i>	(DASP Collab.)	REFID=22114
BARTEL	78B	PL 79B 492	W. Bartel <i>et al.</i>	(DESY, HEIDP)	REFID=22111
TANENBAUM	78	PR D17 1731	W.M. Tanenbaum <i>et al.</i>	(SLAC, LBL)	REFID=22112
BIDDICK	77	PRL 38 1324	C.J. Biddick <i>et al.</i>	(UCSD, UMD, PAVI+)	REFID=22059
BRAUNSCH...	77	PL 67B 249	W. Braunschweig <i>et al.</i>	(DASP Collab.)	REFID=22197
BURMESTER	77	PL 66B 395	J. Burmester <i>et al.</i>	(DESY, HAMB, SIEG+)	REFID=22198
FELDMAN	77	PRPL 33C 285	G.J. Feldman, M.L. Perl	(LBL, SLAC)	REFID=22062
YAMADA	77	Hamburg Conf. 69	S. Yamada	(DASP Collab.)	REFID=22064
BARTEL	76	PL 64B 483	W. Bartel <i>et al.</i>	(DESY, HEIDP)	REFID=22192
TANENBAUM	76	PRL 36 402	W.M. Tanenbaum <i>et al.</i>	(SLAC, LBL) IG	REFID=22194
WHITAKER	76	PRL 37 1596	J.S. Whitaker <i>et al.</i>	(SLAC, LBL)	REFID=22151
ABRAMS	75	Stanford Symp. 25	G.S. Abrams	(LBL)	REFID=22176
ABRAMS	75B	PRL 34 1181	G.S. Abrams <i>et al.</i>	(LBL, SLAC)	REFID=22177
BOYARSKI	75C	Palermo Conf. 54	A.M. Boyarski <i>et al.</i>	(SLAC, LBL)	REFID=22179
HILGER	75	PRL 35 625	E. Hilger <i>et al.</i>	(STAN, PENN)	REFID=22186
LIBERMAN	75	Stanford Symp. 55	A.D. Liberman	(STAN)	REFID=22046
LUTH	75	PRL 35 1124	V. Luth <i>et al.</i>	(SLAC, LBL) JPC	REFID=22188
WIJK	75	Stanford Symp. 69	B.H. Wiik	(DESY)	REFID=22050